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Pilot Evaluation of Sailplane Handling Qualities

A. G. Bennett, Jr.

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Pilot Evaluation of Sailplane Handling Qualities

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under Grant NSG-1284



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1. INTRODUCTION

The performance of competition sailplanes as measured by maximum lift to drag ratio ($L/D_{\max}$) or average cross-country speed has shown a steady improvement with time as shown in Figure 1 (Reference 1). This performance improvement has been due to the continual evolution of airfoils and of fiberglass and metal structures to achieve low drag and high aspect ratio wings. The quest for high performance has had a profound effect upon the handling qualities of sailplanes. The increased $L/D_{\max}$ has increased the range of flight speeds. To minimize the trim drag, the static stability margin has been decreased which has increased control sensitivity and decreased pitch control force gradients. The very slender wing and fuselage structures have also introduced aeroelastic effects upon the sailplane control response characteristics.

There has been some concern voiced about the trends in high performance sailplane handling qualities. Poor handling qualities generally result in increased pilot workload which may compromise flight safety. Thus there is a strong interest in determining whether the current trends in sailplane performance improvement can continue while at the same time a high level of flight safety can be maintained.

The primary objective of this study was to make a qualitative evaluation of all aspects of high performance sailplane handling qualities and to define areas which require further study. To accomplish this objective at a modest cost, a round-robin flight evaluation of several sailplanes by several test pilots was conducted. The Cooper-Harper Rating Scale and pilots' comments

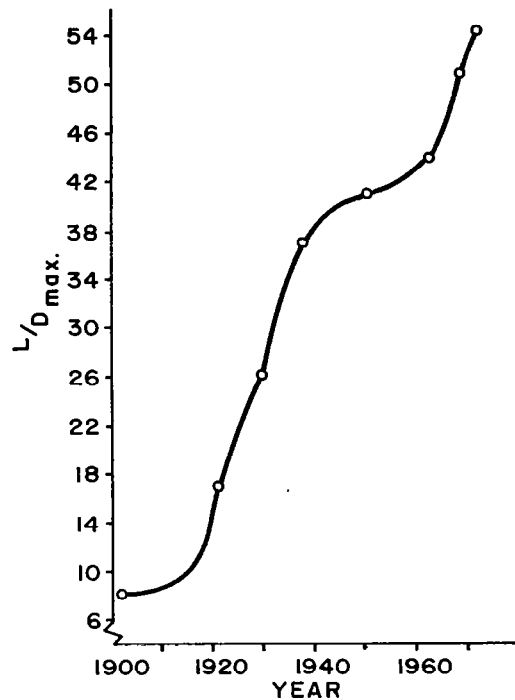


Figure 1. $L/D_{\max}$ Versus Time

were to be used to evaluate the sailplane handling qualities. The specific objectives of this study were:

1. Using the Cooper-Harper Rating Scale and pilot comments investigate the handling qualities of high performance sailplanes.
2. Obtain pilot opinion of handling quality characteristics to assist the formulation of airworthiness standards.
3. Develop a data base of pilot opinion which would be of value in the design of future sailplanes.
4. Delineate areas which warrant more quantitative study.

The development of high performance sailplanes has evolved in discrete stages with several sailplanes vying for the market at each stage. Thus it was determined that if the sailplanes developed since the early 60's were arranged into groups, then one sailplane from each group should be chosen for the evaluation session. The sailplane grouping logic is given as follows:

- Group 1: Borderline between utility and racing class, $L/D_{\max}$ mid 30's.
- Group 2: First sailplanes to use fiberglass structures. Represents technology in the late 60's. Most have camber changing flaps and/or drag chute.
- Group 3: Sailplanes developed in early 70's. Most numerous class in USA today, hence important.
- Group 4: Sailplanes developed during mid 70's. Just becoming available in substantial numbers. Most have landing flaps.
- Group 5: Very high performance, $L/D_{\max} \approx 50$. Effect of large span on handling can be established by this class.
- Group 6: High performance two place. Used in transition to high performance single place sailplanes.

Test pilots for the flight session were chosen from NASA, FAA and the soaring community to ensure that a wide range of pilot backgrounds would be brought to bear upon the sailplane handling quality evaluations.

The text which follows describes the evaluation session and presents the analysis of the pilot opinion data. Chapter 2 describes the sailplanes, pilots and the flight session. Chapter 3 presents the analysis of the pilot

ratings and comments. The evaluation questionnaire, pilot ratings, and pilot comments are presented in the Appendices.

The sailplane owners are due a special thanks for lending their sailplanes for the flight test session. They were Mr. John Thompson, McCrory, Arkansas; Mr. Lanier Franz, Roanoke, Virginia; Mr. Dave Lawrence, Starkville, Mississippi; Mr. Marion Griffith, Dallas, Texas; Schweizer Aircraft Corporation, Elmira, New York; and the Air Force Flight Dynamics Laboratory, Dayton, Ohio. Many members of the Soaring Society of America gave this project unstinting support. Mr. Howard Ebersole, Associate Director of the RASPET Flight Research Laboratory, provided excellent organizational support in the sailplane preparation and in the flight session. The departmental staff support for this project was as usual, superb.

2. SAILPLANE FLIGHT TEST SESSION DESCRIPTION

2.1 Introduction

The flight test session had to satisfy several requirements and constraints. The round-robin evaluation format required that six sailplanes and seven test pilots must be on site simultaneously. To accommodate the pilots busy flight schedules, the flight session was organized to conduct the flight activities necessary to acquire the required data in a maximum of 7 days. The session was scheduled for the early May period to avoid conflicts with the soaring season, and yet to have the possibility of encountering soaring conditions. In all respects, the flight session was a complete success. There were no problems acquiring the sailplanes, the weather during the flight session was perfect, the test pilots were very enthusiastic, and cooperative, and all operations were conducted safely.

2.2 Evaluation Sailplanes

Within the previously mentioned groups of sailplanes, a ranking was made to determine which one had characteristics of most interest to this investigation. At the same time, only sailplanes with standard approved type certificates were considered. The soaring community was most cooperative in supporting the acquisition of the evaluation sailplanes.

Sailplane 1. This sailplane was chosen since it represents the transition to higher performance ships. It has a fixed horizontal stabilizer with a fairly large chord elevator. The fixed gear is ahead of the center of gravity. The sailplane is equipped with schemmp-Hirth type divebrakes.

Sailplane 2. This sailplane is equipped with camber changing flaps which are inter-connected with the ailerons. The landing gear is retractable and is ahead of the center of gravity. The sailplane has schemmp-Hirth type divebrakes, and a very short, straight control stick. The sailplane is placarded against intentional spins.

Sailplane 3. This sailplane was selected from Group 3. It has an all-moveable horizontal tail and a control stick which curves slightly toward the pilot. The ship is equipped with retractable landing gear ahead of the center

Table 1
Sailplane Dimensional Parameters

Parameters	Units	Sailplane					
		1	2	3	4	5	6
Wing Span	m	15.0	15.0	15.0	15.0	20.3	17.4
Wing Area	m ²	12.40	9.48	10.00	9.64	14.40	16.72
Aspect Ratio		18.1	23.6	22.5	23.3	28.6	18.0
MAC	m	0.885	0.687	0.704	0.681	0.756	1.069
Max Weight	kg	299	300	300/390	299/422	445/580	649
Wing Loading	n/m ²	234.6	311.2	325.6/383	306.4/430.9	301.6/392.6	378.3
Root Chord	m	1.232	0.940	0.955	0.914	0.980	1.483
Tip Chord	m	0.394	0.343	0.368	0.373	0.350	0.483
Fuselage Length	m	6.680	6.198	6.350	5.842	7.290	8.153
Fuselage Width	m	0.584	0.610	0.635	0.584	0.610	0.813
Hor. Tail Area	m ²	1.65	1.04	0.99	1.00	0.99	2.03
Hor. Tail Span	m	2.819	2.395	2.408	2.032	2.408	3.200
Elevator c_f/c		0.42	0.28	1.00	0.56	1.00	1.00
Vert. Tail Area	m ²	1.13	1.06	0.84	0.78	---	1.43
L/D max (Handbook)		32	39	35.2	37	49	34
Fwd C.G.	% $\bar{c}$	20	25	26	27.8	29	25
Aft C.G.	% $\bar{c}$	40	52	47	38.2	45	38
I _{yy} (Approx.)	kg m ²	186	186	204	186	407	1178

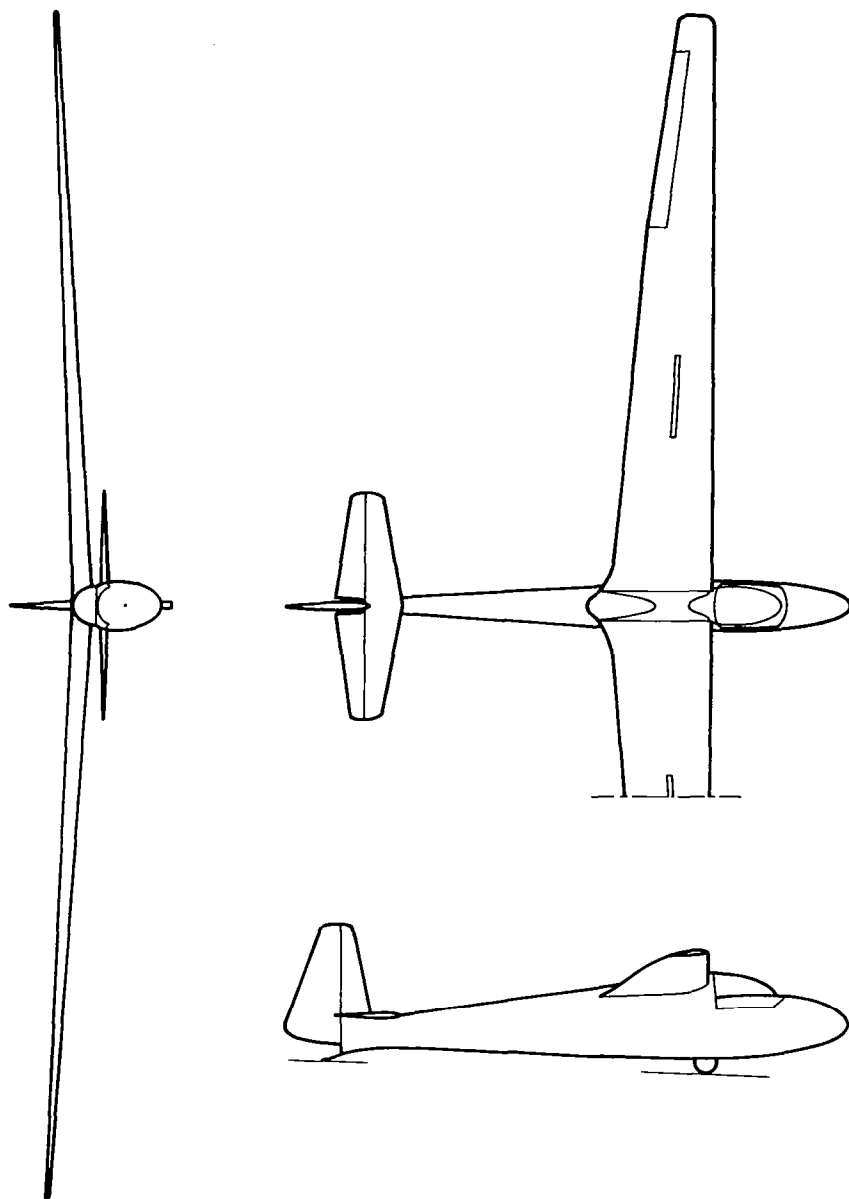


Figure 2. Three View of Sailplane 1.

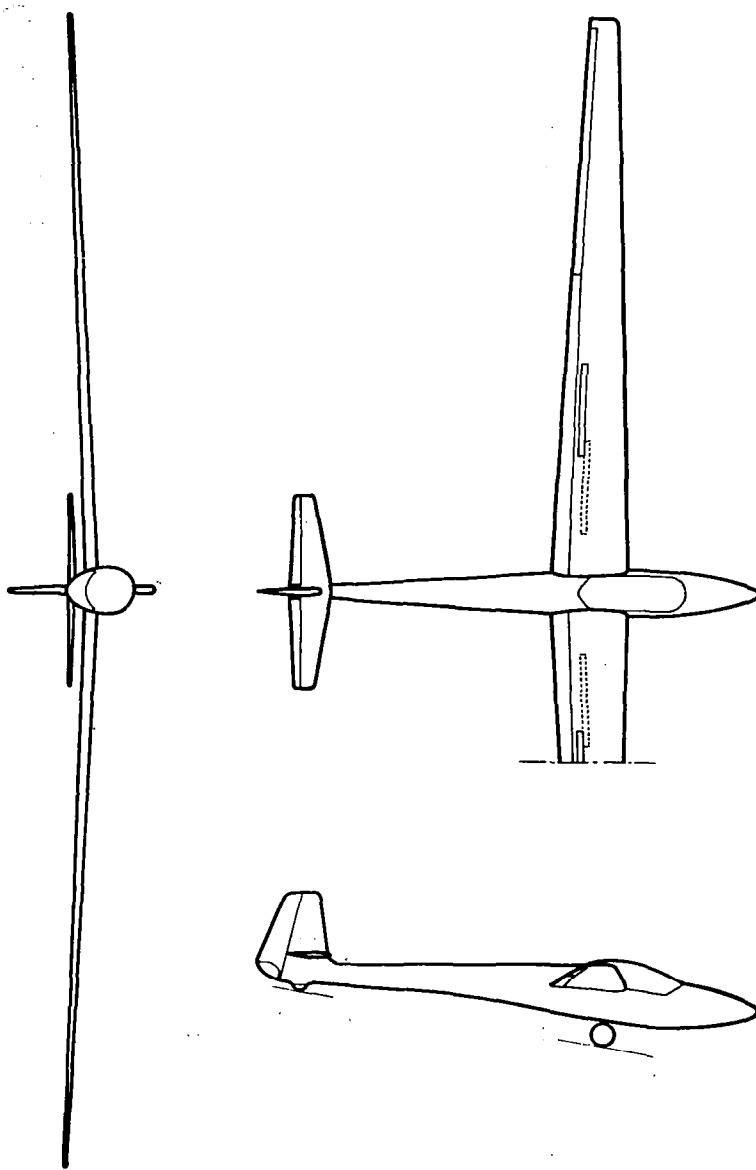


Figure 3. Three View of Sailplane 2.

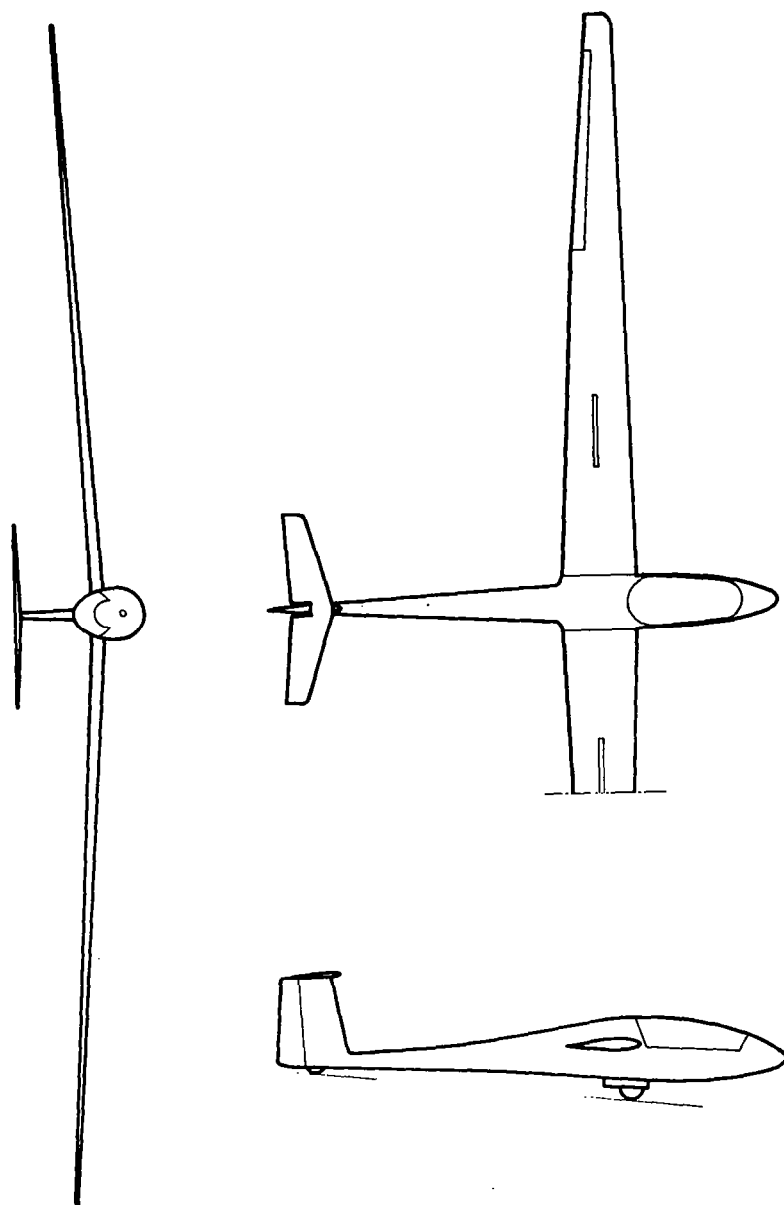


Figure 4. Three View of Sailplane 3.

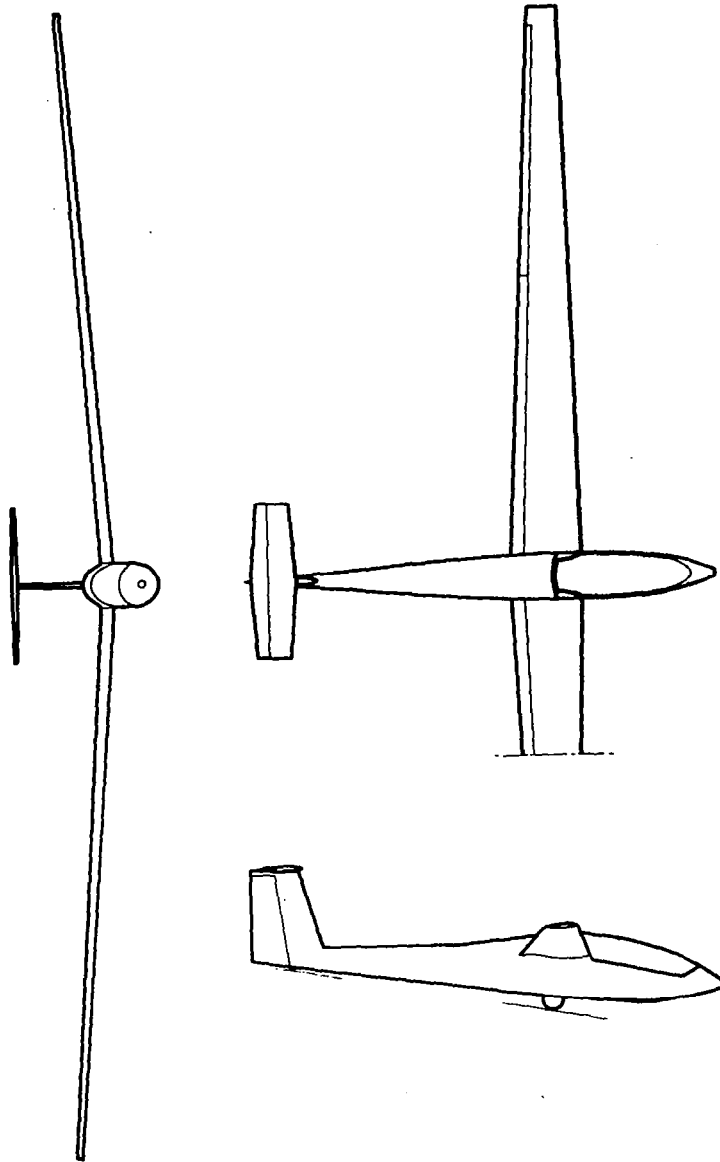


Figure 5. Three View of Sailplane 4.

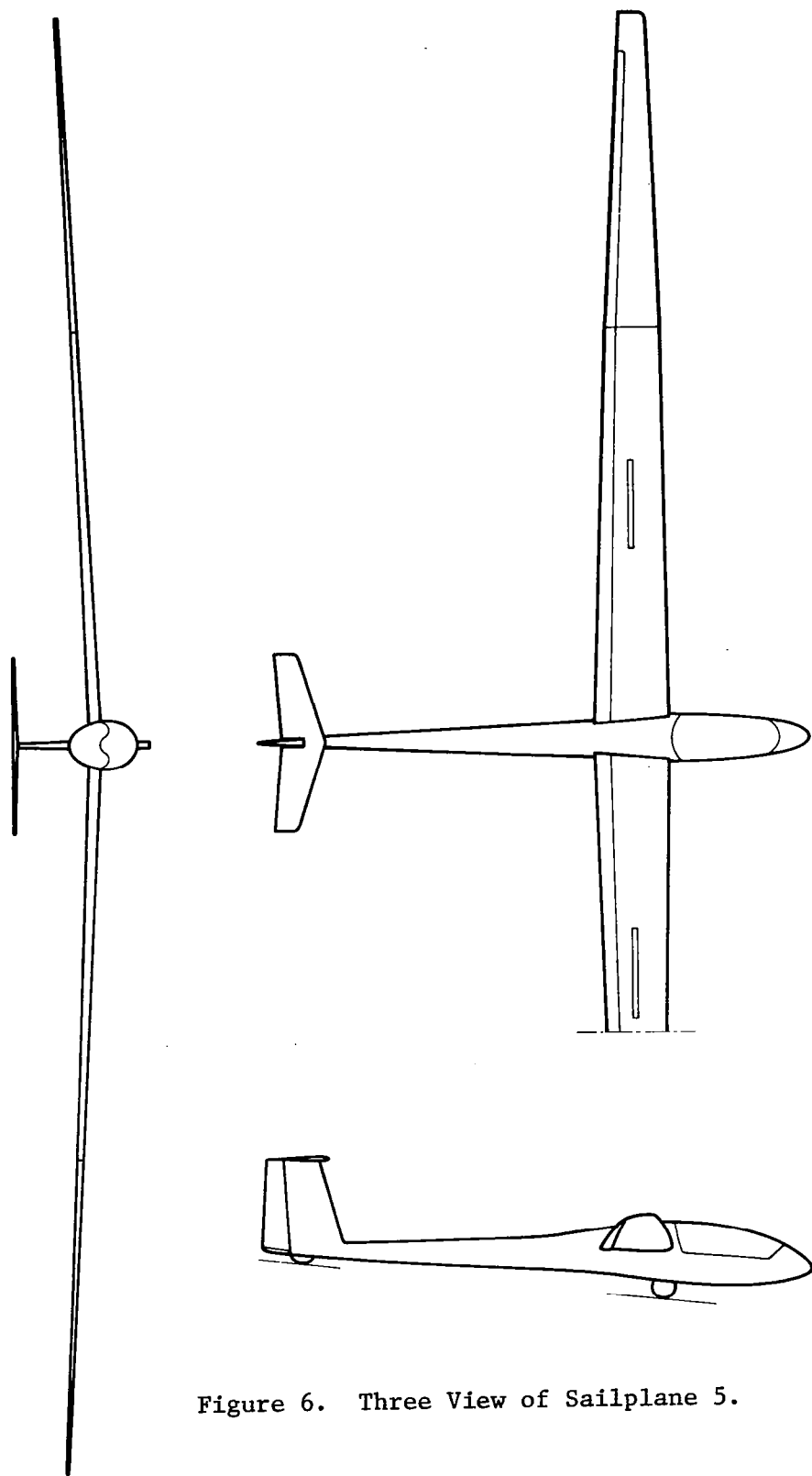


Figure 6. Three View of Sailplane 5.

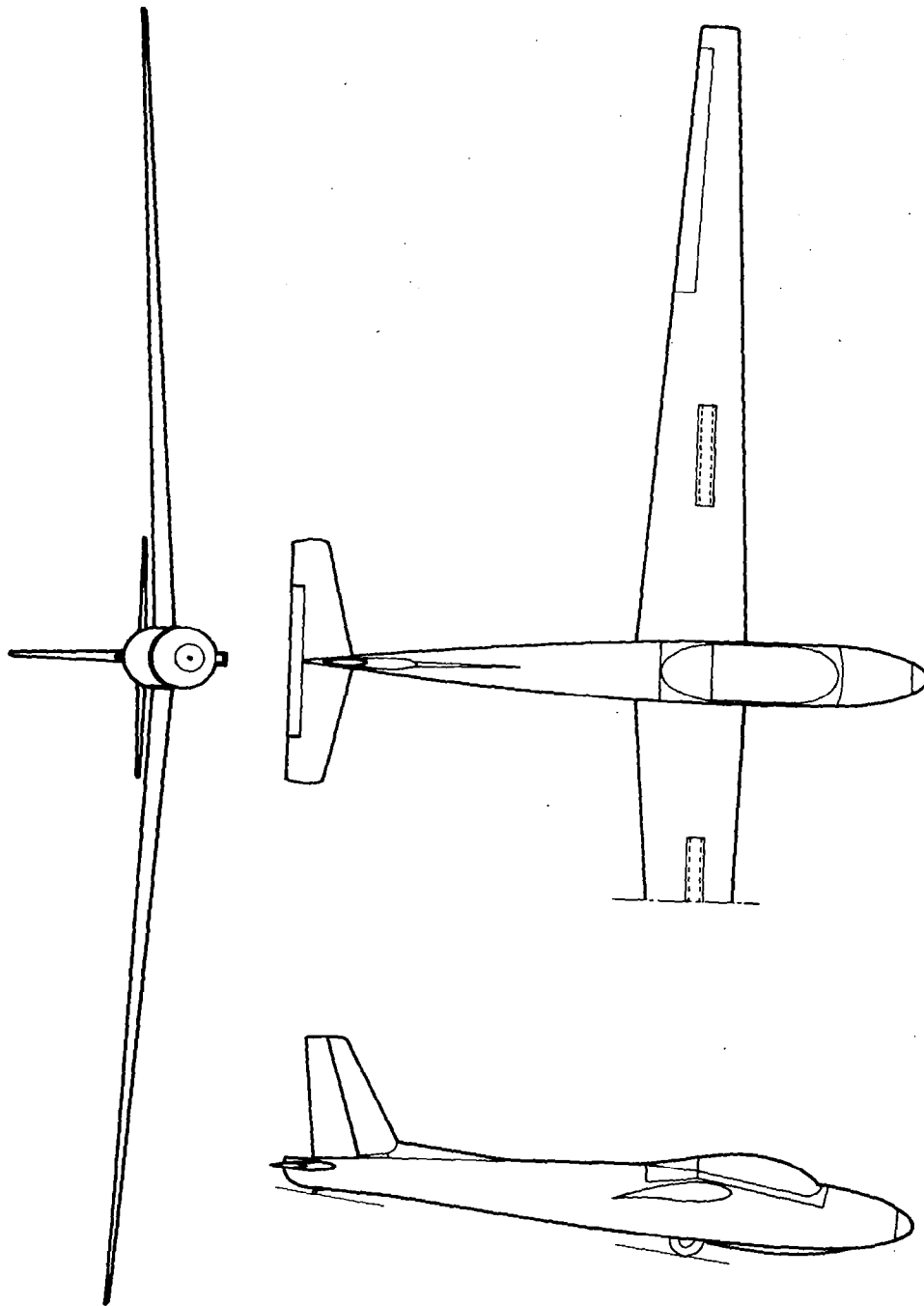


Figure 7. Three View of Sailplane 6.

of gravity, and has upper surface divebrakes. Intentional spins are prohibited with this sailplane.

Sailplane 4. This sailplane has a conventional fixed stabilizer and moveable elevator. The retractable landing gear is located slightly behind the center of gravity. The camber changing flaps, interconnected with the ailerons, can be positioned up to 90 degrees for landing.

Sailplane 5. This ship had the largest wing span among the evaluation sailplanes. The horizontal tail, control stick and landing gear arrangement was identical to that of sailplane 3. This ship is equipped with camber changing flaps interconnected with the ailerons, and with upper surface divebrakes.

Sailplane 6. This sailplane represented a typical, fairly high performance two seater. It features a fixed landing gear, an all moveable horizontal tail equipped with anti-servo tab and large counterbalanced dive brakes.

A three-view drawing of each sailplane is shown in Figures 2 through 7, and the principal geometric characteristics are presented in Table 1.

In general, each sailplane was in excellent mechanical condition. Since in some of the ships intentional spins were prohibited and/or some of the ships were not equipped with water ballast or drag chutes, the effect of these three-factors on the overall sailplane handling qualities was not evaluated.

2.3 Evaluation Pilots

Each evaluation pilot is affiliated with one of the following organizations: Soaring Society of America, Inc., the Federal Aviation Administration and the National Aeronautics and Space Administration. Table 2 indicates the number of flight hours as pilot in command of each pilot. Two of the pilots were professional experimental test pilots and had considerable experience with the Cooper-Harper rating scale. Four of the seven pilots had considerable sailplane cross-country and competition flying experience. Preceding the flight test sessions, these four pilots were asked to describe to the rest of the group in detail what they conceive to be the flight role or mission of

a high-performance sailplane. Thus, all of the pilots had a clear understanding of the broad mission for which this class of aircraft is designed.

Table 2
Evaluation Pilot Flight Experience

Aircraft Type	Pilot						
	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
Sailplane	6500	1500	700	30	20	1500	20
SEL	500	500	200	600	200	1000	2450
MEL		1800		2600	3800	5000	1250
Jet Fighter		2500			1000		1500
Jet Transport		450		7000	3500	4000	550
Helicopter		50					250

2.4 Flight Session Preparation

To achieve the objectives of the evaluation session, several tasks were conducted prior to the session. An overriding consideration was the round-robin format for the session which required six sailplanes and seven pilots to be brought together for a one week period. Since the pilots were available for a limited time, it was most important that the sailplanes be properly prepared in advance of the session. A constraint upon the session date was that it must occur early in the year so that the borrowed sailplanes would not be away from the owners during contest activities.

The session data was scheduled for May 1 thru May 6, 1976, so that University students could assist in the flight operations. With the grant awarded February 16, 1976, this session date would allow time for sailplane acquisition, pilot selection, sailplane checkout, instrumentation development and flight session planning. The schedule was tight but all objectives were accomplished.

The acquisition of the sailplanes was found to be much easier than anticipated. A few phone calls to members of the soaring community quickly revealed that the sailplanes of interest were available in the southeastern region of the U.S. The owners were most interested in assisting in this investigation.

Prior to the flight session, all sailplanes except 4 and 5 were acquired with sufficient time for a thorough inspection, airspeed calibration check, and weight and balance check. Sailplanes 4 and 5 were delivered by evaluation pilots and had prior checkout.

Sailplane 6 was acquired early and was used as a testbed for formulating the evaluation tasks and for the development of a simple sailplane data acquisition system. A battery powered signal conditioning unit was developed to give a digital display of either stick position or stick force to the pilot. It was found that small low friction potentiometers could be quickly attached to the sailplane control linkages, but the press of other flight activities and difficulties with pilot data recording limited the utility of quantitative data recording during the flight session. The stick forces were too low for the stick force balance borrowed from Dryden Flight Research Center and also the balance was too bulky for high performance sailplane control sticks.

2.5 Flight Session

The flight session was conducted May 1 through May 6, 1976. The weather was ideal throughout the session with a wide range of convection conditions present. The pilots were allowed to fly each of the ships as required to complete the evaluation questionnaires. Cassette recorders were used to record inflight comments to be used later during the evaluations. A maneuver list was supplied to further support the evaluation.

A total of ninety-eight flights were made for a total of 80 flying hours. The sailplane evaluation forms were completed during the session to maximize evaluation effectiveness. The pilots were most cooperative and willing to participate. The session was very flight intensive, yet all objectives were accomplished without any mechanical or safety problems.

2.6 Pilot Opinion Sampling Instruments and Data Presentation

The primary objectives of this study were to (1) obtain pilot opinion of the handling qualities of current high performance sailplanes, (2) to aid in the formulation of certification criteria, (3) to provide some guidance in future designs, and (4) to delineate areas which require further study. The most cost effective method to accomplish this task was to stage a round-robin

flight session in which seven test pilots evaluated six sailplanes representing distinct groups. The detailed sailplane handling quality pilot opinion data was obtained with a questionnaire which used the Cooper-Harper Rating Scale and pilot comments.

Questionnaire I (Appendix A) was designed to record the pilot's rating and comments of the sailplanes' handling qualities, design and cockpit layout. Each test pilot completed a questionnaire for each sailplane that he flew. The questionnaire was configured to evaluate the pilots' opinion of the sailplane handling qualities over the entire operating envelope from takeoff to landing. Specifically, each flight consisted of a tow to an altitude of 2700 or 3300 meters (AGL) depending on the pilot's preference. Evaluation tasks in smooth air were carried out before the flight reached lower altitudes (1000-1200 meters AGL) where convective conditions were usually encountered. On the average, the duration of each flight was 45 minutes, although some thermalling flight evaluations lasted as long as two hours. Evaluations were made in both smooth air and in thermalling flight to determine if there were any significant pilot opinion differences between the smooth air test conditions and the usual operational environment, that is under convective conditions. A set of maneuvers listed in Table 3 was flown by each pilot to provide a basis for the evaluations. The pilots made comments on cassette recorders during each flight and these comments were transcribed by the pilots to the questionnaires. The questionnaire included evaluations of the design and cockpit layout.

The Cooper-Harper Rating Scale (Reference 2), widely used in the evaluation of handling qualities of powered aircraft, was adopted for this questionnaire. The attractive feature of the Cooper-Harper Rating Scale, Figure 8, is the decision tree structure which guides the pilot to a number for his rating value. For this initial study, the interpretation of the rating scale was broadened to be used in the evaluation of such sailplane characteristics as ease of assembly, inspection, and cockpit layout. The key to this interpretation was the assumption that the pilots would compensate for deficiencies in the design as they would for deficiencies in flight stability and control. It should also be noted that only two of the seven pilots had extensive previous experience with the Cooper-Harper rating scale.

Table 3
Evaluation Flight Tasks

A. Smooth Air Maneuver List

1. Evaluate take-off roll.
2. Evaluate tow characteristics; box tow plane.
3. Release, slow flight, stall entry, general characteristics.
4. Attain and maintain constant IAS:50-70-90 kts. Evaluate trim capability over speed range. Note friction, noise, and vibration level.
5. Evaluate return to trim at 60 and 90 kts IAS.
6. Evaluate stick free stability. Trim at 60 and 90 kts. Introduce 5 kts airspeed perturbation and release stick. Note rate of convergence or divergence, time period of oscillation.
7. Evaluate stick position and force gradients over speed range. Trim at 75 kts, decelerate slowly to near stall then accelerate to 100 kts.
8. Evaluate pitch altitude response to small stick pulses over speed range especially at high speed (may be combined with Item 7).
9. Evaluate stick forces during pull up from high speeds.
10. Time roll rate during turn reversal (from 45° to 45° bank) at min. sink speed and at 65 kts. Evaluate ease of maintaining constant airspeed and coordination (zero sideslip).
11. Evaluate steady sideslip. Note force levels during rudder over-balance.
12. Evaluate constant g turn, 45° bank, 60 kts, L and R.
13. Evaluate constant g turn, 60° bank, 70 kts, L and R.
14. Evaluate flight path control system, pattern, flare characteristics, ease of touchdown control, landing roll.

B. Convective Flight Maneuver List

1. Evaluate takeoff, possibly crosswind effects, and tow characteristics in turbulence.
2. Evaluate stall/spin (incipient spin only) characteristics. Note onset of pre-stall buffet.
3. Thermalling characteristics
 - a. Low speed turns
 - b. Stall-spin susceptibility, recovery
 - c. Control characteristics near other aircraft
4. Interthermal flight evaluation. Fly at max L/D speed plus 10 kts and at rough air airspeed or 100 kts IAS (whichever is lower).
5. Evaluate handling during secondary task.
6. Evaluate glide path control, touchdown and rollout characteristics in turbulence.

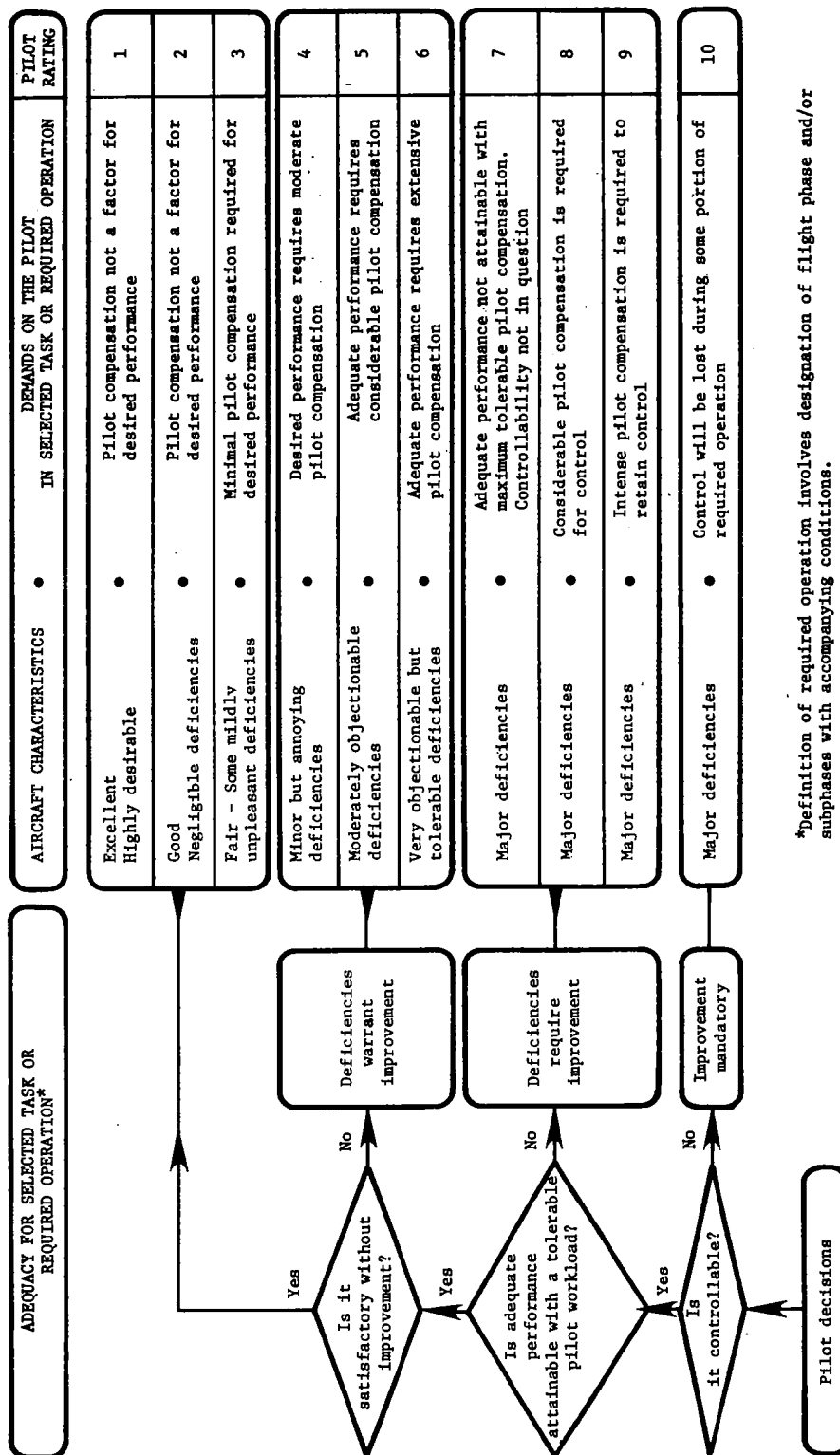


Figure 8. Cooper-Harper Rating Scale

Consequently, the other pilots had a tendency to use the Cooper-Harper Scale as a linear interval scale.

After the flight session was completed, the Cooper-Harper ratings and pilots' comments for each task of Questionnaire I were transcribed into a data file on the university mainframe computer to facilitate the analysis and presentation of the data. The Cooper-Harper Rating Scale, is not a linear scale, thus statistical techniques do not strictly apply. However, averages and standard deviations were computed to gain some measure of the consensus of pilot opinions. An average and standard deviation of all sub tasks for each pilot were computed to allow correlation of the average of sub tasks ratings with the major task rating. The pilots' responses to Questionnaire I are given in Appendix B. The format adopted was to group the responses of all pilots for all sailplanes covering a major area of interest such as longitudinal handling, etc. Extreme caution should be exercised in drawing conclusions from the numerically averaged ratings. As can be seen from the individual pilot ratings, different pilots used different standards of acceptance.

3. RESULTS AND DISCUSSION

3.1 Pilot Rating Summaries

The Cooper-Harper Rating Scale is a valuable tool in the evaluation of aircraft handling qualities. To provide a measure of the variability of the pilot's assignment of ratings, averages and standard deviations for each task were computed for each sailplane. Again, it must be emphasized that the Cooper-Harper Rating Scale is non-linear and thus statistical methods do not strictly apply. Table 4 presents a summary of the average and standard deviation of all pilot ratings of a task for each sailplane. These average readings should not be directly compared with the levels of acceptability shown on the Cooper-Harper scale, but are rather a gross indication. Average Cooper-Harper ratings greater than 3.5 (with no specific meaning attached) have been underlined to delineate areas where problems were noted by most of the pilots. The standard deviations are a measure of the variation in the pilot's rating of a particular task.

Pilot rating numbers without their accompanying pilot comments are of very little value. The individual pilot ratings and comments furnished in Appendix A are rather formidable in their volume and scope. The numerical summaries of Table 4, rather than being accepted by the reader at their Cooper-Harper rating scale face value, should be used as a guide to point out sections of particular interest in the appendix pilot rating information.

Sailplanes 4 and 6 received poor ratings in construction and rigging. Sailplanes 4 and 5 rated down in cockpit layout, sailplanes 3 and 5 in longitudinal handling qualities, and sailplane 6 in stall/spin characteristics. Sailplanes 3, 4, and 5 were given poor ratings in landing characteristics, and sailplane 6 in circling flight. Sailplane 1 received consistently higher ratings than all other aircraft, in every rating category, and was often cited as a benchmark of excellence for sailplane handling qualities. To gain more than this superficial information, the reader must refer to the individual pilot comments in the above areas, which provide an understanding of the reasons for the ratings.

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Table 4 (Continued)

TASK	SAILPLANE											
	1	2	3	4	5	6	1	2	3	4	5	6
	AVG	STDV	AVG	STDV	AVG	STDV	AVG	STDV	AVG	STDV	AVG	STDV
C. Pilot Opinion of Long-Handling	1.25	.43	2.60	.49	4.10	1.11	3.20	.75	4.20	1.33	2.67	.94
1. Ease of Est & Main Con Airspeed	1.57	.90	2.43	.73	2.29	.45	2.67	.47	2.40	.80	2.00	.58
2. Plane Trim Sys. Over Speed Range	3.86	.64	3.00	.53	2.33	1.25	2.33	.94	2.60	1.20	2.60	1.02
3. Pitch Sensitivity	1.29	.45	2.29	.45	2.71	.70	2.17	.69	3.20	1.17	1.67	.47
4. Stick Force Gradient	1.57	.49	2.14	.99	2.29	1.03	3.17	1.07	2.80	1.17	2.33	1.25
5. Stick Fixed Stability	1.25	.43	1.50	.50	2.25	.43	2.00	.00	2.00	.00	2.00	.63
6. Stick Free Stability	1.17	.37	2.29	1.16	3.43	2.77	2.17	.69	4.20	2.93	2.20	.40
7. Return to Trim	1.83	.69	3.17	1.07	3.80	3.19	1.40	.49	4.25	3.42	1.80	.75
8. Maneuvering Response	1.29	.45	2.86	.35	2.71	.88	2.17	.90	3.60	1.62	2.00	.58
9. Phugoid Characteristics	1.60	.49	2.83	.69	5.29	2.60	2.40	.49	5.40	2.58	2.00	.00
10. Dive Recovery	1.71	.45	2.71	.88	4.00	2.00	2.20	.98	3.30	1.78	2.00	.00
D. Pilot Opinion of Lateral Handling	1.00	.00	2.80	.75	2.20	.51	2.20	.40	2.60	.80	2.00	.00
1. Aileron Force Gradient	1.43	.49	2.14	.64	1.86	.64	2.17	.37	2.20	.40	2.00	.00
2. Rudder Force Gradient	1.43	.49	1.86	.83	2.29	1.03	2.17	.37	2.60	.49	2.17	.37
3. Roll Rate over Speed Range	2.00	.93	2.14	.35	1.86	.64	2.58	.45	3.30	1.08	2.50	.76
4. Sideslip Characteristics	2.00	.76	2.83	.69	2.86	.64	2.17	.90	2.80	.75	2.60	.49
5. Ease of Turn Entry	1.29	.45	2.71	.70	1.86	.64	2.00	.58	2.60	1.02	2.20	.75
6. Yaw Due to Aileron	2.00	.58	2.67	.75	2.17	.69	2.40	.80	3.00	1.55	2.50	.50
7. Yaw Due to Roll	2.00	.63	3.40	.49	2.20	.75	2.25	.83	2.00	.00	2.33	.94
8. Ease of Main. 45° Bank Turn	1.43	.73	1.86	.64	1.64	.69	2.00	1.00	1.20	.40	2.58	1.24
9. Ease of Main. 60° Bank Turn	1.57	.73	2.14	.64	1.93	.78	2.00	1.00	1.60	.49	2.83	1.07
E. Pilot Opin. of Plane Stallspin Char.	1.88	.74	2.20	1.60	2.40	1.02	3.00	.63	2.20	.75	4.33	1.25
1. Rudder, Aileron Effect Dur. Stall	2.00	.53	1.12	1.12	1.86	.64	2.33	.75	2.00	.63	3.00	1.15
2. Stall Warning	2.43	.49	2.71	1.39	2.43	.90	2.50	.76	2.20	.98	2.33	1.25
3. Aggravated Stall-Tend to Spin	2.00	1.00	2.14	1.73	2.57	.90	3.00	.58	2.20	.98	4.00	1.15
4. Stick Force Gradient	1.57	.73	2.00	.76	2.57	.73	2.00	1.00	2.60	.49	2.33	1.25
5. Stall Recovery, Altitude Loss	1.33	.47	1.67	.75	2.14	.64	1.80	.75	1.80	.75	3.67	1.89
6. Spin Entry	1.75	.83	3.00	1.41	2.33	.94	2.67	.47	2.00	.71	4.50	1.12
7. Spin Recovery	1.00	.00	1.50	.50	2.00	1.00	1.50	.50	2.50	.50	2.00	1.00
8. Stall From Turn at Low Speed	1.50	.50	1.86	1.12	1.67	.47	2.25	1.09	2.00	1.10	4.00	2.52

Table 4 (Continued)

SAILPLANE												
TASK	1		2		3		4		5		6	
	AVG	STDV	AVG	STDV	AVG	STDV	AVG	STDV	AVG	STDV	AVG	STDV
F. Pilot Opin. of Plane Landing Char.	1.70	.40	2.75	1.30	3.20	.40	3.50	.50	2.90	.66	2.33	.47
1. Pilot Visibility	2.57	.90	1.43	.73	1.43	.49	1.50	.50	1.40	.49	1.00	.00
2. Glide Slope Control	1.57	.73	3.00	.93	2.57	.49	2.67	.47	2.40	.49	1.33	.75
3. Airs. Control, Airb. Ease of Mod.	2.14	.99	3.14	.99	3.14	.35	4.08	.61	2.60	.49	1.60	.80
4. Ease of Land. at Intended Spot	1.57	.49	2.57	.73	2.57	.73	3.87	.40	2.40	.49	1.50	.50
5. Ease of Control, Sink at Touch	1.50	.50	2.29	.88	2.43	.49	2.54	.85	2.40	.49	1.80	.40
6. Control During Rollout	1.43	.73	2.57	.73	4.00	2.38	1.67	.47	4.00	1.26	1.33	.47
III. Flight Characteristics in Convection	1.00	.00	2.50	.71	2.60	.49	2.62	.41	3.20	1.17	3.00	1.22
A. Pilot Opinion of Tow	1.50	.76	2.42	.84	2.42	.61	2.00	.00	3.87	1.43	2.25	.43
1. Ease of Maintaining Position	1.33	.75	2.50	.96	2.50	.50	2.00	.00	3.00	1.22	2.00	.00
2. Response to Vertical Currents	1.83	.69	2.50	.50	2.83	.69	2.00	.00	2.50	.50	2.00	.00
3. Release	1.80	.40	1.75	.43	2.00	.63	2.33	.47	2.00	.82	2.00	.00
B. Pilot Opinion of Circling Flight	1.00	.00	2.40	.97	2.00	.00	2.87	.74	2.30	.75	4.33	2.62
1. Low Speed Handling	1.17	.37	2.83	.90	2.00	.58	2.75	.83	2.40	.49	5.00	2.16
2. Stall-Spin Susceptibility	1.75	.38	2.33	1.37	2.00	.58	2.37	.41	1.60	.49	5.33	2.87
3. Ease of Centering Thermal	1.83	.69	2.33	.75	2.00	.58	2.75	.43	2.75	1.09	3.33	.47
4. Speed Control	1.50	.50	2.17	1.21	2.33	.47	3.25	1.09	2.20	.98	4.33	1.25
C. Pilot Opinion of Cruising Flight	1.60	1.20	2.20	.98	2.60	.97	2.37	.65	2.20	.98	1.67	.47
1. Ease of Controlling Airspeed	1.67	1.11	2.17	.69	2.33	.94	2.37	.65	2.60	1.36	1.50	.50
2. Pull up into Thermal	1.67	.47	2.00	1.15	2.00	.82	2.87	.89	2.00	.63	2.50	1.50
3. Ease of Pref. Secondary Tasks	1.50	.50	2.50	1.12	3.00	.82	2.50	.50	3.20	1.94	1.50	.50
4. Ride Quality	2.17	.80	2.17	.37	2.25	.56	2.75	.43	1.80	.75	2.50	.50
5. Ease of Main. Straight Flight	1.40	.49	2.33	1.11	1.50	.50	1.75	.43	1.60	.80	1.75	.43

3.2 Pilot Evaluation of Ease of Assembly, Inspection and Cockpit Layout

Although these factors are generally not regarded as an essential part of handling qualities, as, say, longitudinal stability, all three characteristics do influence the ease and precision with which the pilot is able to perform tasks for the overall mission of the sailplane. In rating these characteristics, the pilots tended to disregard the dichotomous structure of the Cooper-Harper scale; instead, they were asked to rate these factors on a linear scale from one to ten. Also, three of the pilots did not rate the ease of assembly and inspection since the flight test session did not provide enough time for them to become familiar with these characteristics.

The pilots who rated the ease of assembly and ease of control system inspection generally gave better ratings to the newer machines. These pilot ratings also confirmed the fact that frequent assembly/disassembly is part of the high-performance sailplane role and the ease of assembly should be a very important design objective.

Pilot comments on the cockpit layout show that there were wide variations among the six evaluation sailplanes. The pilots found visibility was adequate in all ships. They singled out poor ventilation, the use of curved control sticks, confusing or unhandy secondary control handles (such as trim and flap handles), need for good pilot protection as areas of concern. The variety of adverse comments indicates the need of some sort of standardization for the location, shape and color of the secondary control handles.

3.3 Pilot Opinion of Longitudinal Characteristics

Takeoff. Average pilot ratings ranged from 1.8 for sailplanes 1 and 6 to 3.2 for sailplanes 2 and 5. Sailplanes 1 and 6 were generally the most stable, had the highest stick forces, and had strong damping of the short period pitching oscillation. Pilots commented that sailplane 2 was more sensitive in pitch than they liked, and that they tended to overcontrol in pitch during takeoff. On sailplane 5, pilots reported disliking the stick bobbing force and aft when rolling over bumps. One pilot felt it necessary to maintain greater ground clearance while he was airborne and waiting for the towplane to accelerate to takeoff speed than with other gliders and that wing flexing resulted in undesirable excursions in fuselage-to-ground

clearance. Although he gave a pilot rating of 2, one pilot noted that on sailplane 4, the longitudinal stick feel-and-trim spring system had high and unsymmetric breakout forces which caused him to overcontrol.

Tow. Again, pilot ratings were best for sailplanes 1 and 6, averaging 1.4 for 1 and 1.5 for 6. The worst average rating was 3.5 for sailplane 5. Pilots strongly objected to inertially induced stick forces, and reported overcontrolling, and a feeling that a serious PIO could occur. When the tow speed was increased from the standard 70 knots to 80 knots, the over-control/PIO tendency was reported more severe. One pilot reported he was unwilling to fly left-handed while raising the landing gear on tow. Sailplane 2 was reported easily upset in rough air, requiring frequent small control corrections. It received several pilot ratings of 3. Sailplane 4 was reported sensitive and easy to overcontrol, receiving pilot ratings of 2 and 3.

Establishing and Maintaining Airspeed. Establishing and holding speed was rated satisfactory for all sailplanes. It was reported by one pilot to be difficult to make fine speed corrections in sailplane 4 due to high breakout forces (his pilot rating was 2 however). For sailplane 5, one pilot reported that a pitch correction tended to continue past the intended point and had to be arrested by a checking control input, (his pilot rating was 4).

Longitudinal Trimming. The trim system on sailplane 1 was rated unsatisfactory. Comments were that it was ineffective and inconvenient. The trim system of every sailplane was reported as inconvenient to use, but only sailplane 1 was rated unsatisfactory. Comments indicated that pilots were content to fly without trimming rather than use inconvenient trim devices, except in the case of sailplane 6 in which stick forces became excessive.

Pitch Sensitivity. Sailplanes 3 and 5 received some pilot ratings of 4 and 5 for oversensitivity. Sailplanes 2, 3, 4, and 5 were described as sensitive, but 2 and 4 did not receive poor pilot ratings for sensitivity.

Stick Force Gradient, Stick Fixed Stability, and Stick Free Stability.

These were not tasks, but requests for opinions on the suitability of the listed characteristics. In the absence of quantitative data and since the pilot comments were rather general, the responses to these three requests for pilot opinion are broadly summarized: sailplane 1 was well liked; numbers 2, 3, and 5 were characterized as having light stick forces, bordering on too

light, while sailplanes 4, and, even more so, 6, were judged to have too-heavy stick forces.

Return to Trim. The pilots were satisfied with the return-to-trim characteristics of all sailplanes, giving pilot ratings of 2 to 3. An exception to this was pilot 1 who apparently excited the phugoid mode on this test and rated phugoid damping. Two pilots felt the task had no relevance to their opinion of a sailplane's handling qualities. Early NACA flying qualities tests by Gilruth (Reference 3) also showed that the tendency to return to trim speed was relatively unimportant for visual flight.

Maneuver Response. Opinions diverged on the maneuvering responses of the six sailplanes. Sailplane 1, 4, and 6 were well liked by all pilots, receiving mostly 1 and 2 pilot ratings. Sailplane 2 received mostly 3 ratings and comments giving the impression it was more responsive than the pilots liked. Sailplanes 3 and 5 got mixed opinions. Sailplane 3 was rated 4 and sailplane 5 rated 5 due to low or nil stick-force-per-g by some pilots. Delayed g response due to the flexible wing was reported to cause difficulty in stabilizing rapidly applied g by one pilot.

Phugoid Characteristics. This was not a flying task susceptible to pilot rating. Nonetheless pilots expressed their opinions of the suitability of the characteristic. Pilots were satisfied with the lightly damped or neutral stick-free phugoids of sailplanes 1, 2, 4, and 6, while some pilots objected to the strongly divergent stick-free phugoids of sailplanes 3 and 5. The divergent motions appeared to be caused by a dynamical interaction between the sailplane phugoid mode and the pitch control system.

Dive Recovery. Sailplanes 1, 4, and 6 were regarded as satisfactory. Sailplane 2 was given satisfactory pilot ratings, but several comments suggested that it was more sensitive than desired. Sailplanes 3 and 5 were rated unsatisfactory by some pilots who commented that the stick forces were too light, and sometimes reversed during pull-outs.

Ease of Centering Thermal, and Speed Control in Circling Flight. All sailplanes were rated satisfactory for these tasks. Comments indicated that the high stick forces and heavy stability of sailplane 6 caused an undesirably high workload in circling at varying bank angles as is typically done in thermalling flight. On sailplane 3, comments noted that the very low or negative stick-force-per-g was very pleasant to fly and felt immediately

natural and comfortable during the thermalling task. On sailplane 5 the same comments were made, and additionally that in an established thermalling turn the stick could be moved as much as 7 cm aft without appreciably affecting the turn. This later characteristic was not felt objectionable.

Table 5
Sailplane Longitudinal Stability and Control Characteristics

<u>Sailplane</u>	<u>Control Forces</u>	<u>Trim</u>	<u>Static Longi- tudinal Stab.</u>	<u>Stick-Free Short Per. Damping</u>	<u>Stick Force Per G</u>	<u>Perceived Sensitivity</u>
1	Aerodynamic + Spring	Spring	Moderate	High	Mod- erate	Moderate
2	"	"	Lo	"	Lo	High
3	Spring + Bobweight	"	"	"	Nil	"
4	Aerodynamic + Spring	"	"	"	Lo	"
5	Spring + Bobweight	"	"	"	Nil	"
6	Aerodynamic	Tab	High	"	Mod- erate	Moderate

Table 6
Summary of Opinions on Longitudinal Handling Qualities

<u>Sailplane</u>	<u>Takeoff and Tow</u>	<u>Straight Flight</u>	<u>Maneuvering & Dive Pull-Out</u>	<u>Thermalling</u>
1	Well Liked	Well Liked	Well Liked	Well Liked
2	Satisfactory	Satisfactory	Satisfactory	Satisfactory
3	Satisfactory	Well Liked	Satisfactory	Well Liked
4	Satisfactory	Satisfactory	Satisfactory	Satisfactory
5	Satisfactory	Well Liked	Unsatisfactory	Well Liked
6	Well Liked	Well Liked	Well Liked	Satisfactory

Table 5 summarizes the longitudinal stability and control characteristics of the sailplanes evaluated and Table 6 summarizes the pilot opinion of longitudinal handling qualities for primary flight tasks. Table 6 shows that longitudinal characteristics best liked for thermalling are less well liked for takeoff, tow, maneuvering, and dive pull-out. From Table 5 it appears that increased stability and reduced sensitivity are beneficial to the first three tasks while lower stability and greater sensitivity are desirable for the last task. Table 6 shows that all the sailplanes had satisfactory or better longitudinal handling qualities for normal flying and thermalling, and that all but one were also satisfactory for maneuvering and dive pull-out. This was not surprising since all of the evaluation sailplanes were commercially successful in series production.

3.4 Sailplane Lateral-Directional Handling Qualities

Sailplane performance growth has not influenced lateral-directional handling qualities as much as the longitudinal handling qualities, although both have been degraded. The only serious lateral-directional problem apparent in current high performance sailplanes is in takeoff and landing, where low roll control and rudder power can lead to loss of directional control, especially in crosswinds. One cause is the placement of the landing wheel ahead of the C.G., which increases weather cock tendencies. Another is a raised C.G. coupled with a further aft and lower placement of the tow line attach point, which introduces a significant rolling moment with sailplane heading/tow line misalignment. This problem warrants further study to better define controllability during takeoff and landing.

Although pilot comments did not reflect any serious inflight problems, improvement in lateral-directional handling qualities, such as roll response quickening, increased roll control power, and reduction in rudder coordination requirements, would enhance performance in soaring flight, due to the importance of quickly acquiring and centering the thermals and of reducing pilot workload. Informal discussions with the evaluation pilots, as well as reported pilot comments, support this conclusion. Pilot opinions were mostly in the "excellent" to "minor but annoying deficiencies" region (pilot ratings 1 to 4).

Sailplane 1 was "excellent" to "good" (pilot rating 1 to 2) in almost every area. Pilot comments emphasized the good control harmony between rudder and aileron and ease of rudder-aileron coordination. Spiral stability was neutral, which was noted as beneficial for thermalling flight.

Sailplane 2 pilot ratings ranged from 2 to 4, with many comments about high rudder coordination workload in maintaining ball-in-the-center flight, both in turns and turn entries as well as level flight. Inadequate rudder control power was cited, as evidenced by insufficient rudder to maintain balanced flight in moderate rate turn entries. Spiral stability was slightly negative in thermalling configuration, which increased rudder-aileron coordination problems. Lateral-directional characteristics for this sailplane could be summarized as distracting and irritating. One pilot commented negatively on pitchup with sideslip, which is peculiar to this sailplane.

Pilot ratings for sailplanes 3, 4, and 5 fell in the 1 to 4 range. In average overall pilot ratings, sailplane 3 was slightly better than sailplanes 4 and 5, but ratings for each sailplane showed different areas of emphasis, as indicated in the following paragraphs.

Sailplane 3 lateral-directional control harmony and coordination was good. Comments ranged from "no problem" to "pleasant". Comments showed, however, that sailplane 1 was better. A comment for sailplane 3 on aileron effectiveness was that ailerons remained very effective even below stall speed.

The only complaints for sailplane 4 were due to the requirement for considerable top aileron in turning flight and mild objection to coordination workload in lateral maneuvering.

Sailplane 5 received good to excellent ratings for its ease of control in maintaining desired bank angles in turning flight. Several pilots objected to its low maximum roll rate of about 15 deg/sec, about 5 deg/sec less than that of all the other sailplanes, though 2 pilots commented that roll rate was surprisingly good for a sailplane of this large a wing span. Other comments indicated that the rudder force gradient was too high and noted too wide a deadband around neutral for airplane response to rudder inputs.

Sailplane 6 was judged as a training sailplane, suitable for transitioning into high performance ships. In this context, it received very good ratings, except for ease of maintaining desired bank angles and for control near the stall. Concerning turning flight, pilots commented that rudder forces were

too high relative to longitudinal stick forces and that unintentional overcontrolling in pitch produced frequent pre-stall airframe buffeting. Lateral control near stall was poor due to decaying roll control power with airspeed decrease.

Rudder overbalance, or "rudder lock" was a characteristic common to sailplanes 2, 3, and 5. The pilots did not find this unsafe or even annoying, except on sailplane 5; one pilot gave sideslips a rating of 4 due to this feature, noting that about 180 N pedal force was required to "unlock" the rudder and that large sideslip angles were possible. Control, however, remained good and very little buffeting occurred at the high sideslip angles. This is classified as a minor but annoying deficiency. Rudder overbalance on the other sailplanes required much less pedal force to unlock. It is concluded that although proportionally increasing rudder pedal force with rudder deflection is a desirable characteristic, rudder overbalance is not unsafe unless very high pedal forces or other overruling characteristics are involved. For instance, sailplane 2 encountered overbalance at about 1/2 rudder deflection and sailplanes 3 and 5 at about 3/4 deflection. These conditions were acceptable, but it might be that overbalance of significantly less rudder deflection would be unacceptable.

3.5 Sailplane Stall/Spin Characteristics

Cross-country soaring flight sometimes involves steep turns at low altitudes to take advantage of whatever lift may be available, avoiding landing unless absolutely necessary. Since optimum airspeed for thermalling flight is near the stall speed, stall and incipient spin characteristics are of prime importance in safety of flight.

Stall warning characteristics of the evaluation sailplanes were described as mild for sailplanes 1 through 5 and too much for sailplane 6. The airspeed stall warning band varied from 1 to 3 kts for the first 4 sailplanes, and were often in a form that could be masked by atmospheric turbulence. However, once the stall was recognized, recovery in most cases was easily and quickly effected by merely relaxing aft stick pressure and flying out of the stalled condition with little altitude loss. Sailplane 6, on the other hand, had a wide stall warning airspeed band of 10-12 kts, which caused stall buffet to

occur frequently at thermalling flight airspeeds. The pilots noted that this is an undesirable characteristic because familiarity with the stall warning buffet degrades its effectiveness and tends to cause the pilot to ignore the warning.

As to stall, incipient spin, and recovery characteristics, sailplanes 1, 2, 3, and 5 generally received good to excellent ratings with sailplane 1 being foremost. Good aileron control was noted, even below stall speed, and abused, cross-controlled stalls did not reveal undesirable qualities. Sailplane 4 recovered immediately with relaxation of aft stick force, but two pilots noted a definite autorotative (spin) tendency if recovery was not executed promptly with wing drop. Sailplane 6 showed a tendency to yaw and roll to the left and to pitch down from a cross-control stall and received lower ratings due to this characteristic toward spinning.

3.6 Sailplane Approach and Landing Characteristics

Once committed to landing, sailplanes cannot go up; it follows that one of the primary considerations in evaluating approach and landing characteristics is ease of glidepath control. Precision in touchdown control is paramount for landing in unprepared and restricted areas, a situation often encountered in cross-country soaring flight. It is therefore not surprising that most of the evaluation sailplanes were criticized for lack of spoiler, flap, or air-brake effectiveness and precision.

Sailplane 6 received the best ratings, in the fair to good category, largely because of the effectiveness of spoilers in controlling glidepath. For instance, one pilot noted that due to dive brake effectiveness, it was easy to make "difficult" landings. "Difficult" here means landings over obstructions into a limited landing area.

Sailplane 1 again received the best rating of all except sailplane 6, although it was noted that the divebrakes were somewhat ineffective. The same comment was made about sailplanes 2, 3, and 5. Sailplane 4 relied only on flaps for glidepath control. This concept was criticized on two points: large changes in pitch attitude with varying degrees of flap extension made precise glidepath control more difficult, and awkward placement, high force requirements, and complex flap control positioning requirements degraded precision of

glidepath control. Some pilots criticized the "suck-open" tendency of spoiler controls on the other sailplanes for the same reasons; the necessity to hold force to restrain spoiler control lever aft movement degraded precise control in pitch with light stick forces, especially if spoiler control forces were high.

It is concluded that more quantitative information should be gathered on primary glide path control capability and also interaction of glide path controls with primary flight controls.

3.7 Pilot Opinion and Certification Criteria

Pilot opinion specifies the characteristics pilots like in sailplanes. Certification criteria specify the characteristics thought by the certifying authority to be essential to their safe operation. There is no reason to expect that pilots will invariably prefer a safer characteristic to one less safe. The contribution to safety of a given characteristic sometimes being recognizable only by a complex analysis or demonstrated in accident patterns. However, in the absence of such analysis or evidence, it would seem sensible that criteria should conform in general to favorable pilot opinion.

General and specific examples of conflicting criteria and pilot opinion follow:

In general, pilots were willing to accept sailplanes that were somewhat more sensitive and less stable in pitch than they liked for take-off, tow, and dive recovery in order to get easy longitudinal maneuvering and low stick forces for soaring flight--the mission of a sailplane. In particular, the criteria specifying a return-to-trim within, say, 10 percent of trim speed was felt to be of no benefit, and when achieved through increased stick centering forces considered to be a harassment. In what way such a criterion is essential to safety is not clear.

The only undesirable characteristic exhibited by some of the high performance sailplanes was marginal control during takeoff and landing. Current certification requirements are vague in this area. A requirement of controllability during takeoff and landing in crosswinds up to a prescribed level would be appropriate.

The requirement that no rudder overbalance occur was considered by some pilots to be overly restrictive. They argued that the natural instinct to straighten out would be sufficient to cue the pilot to overcome the mild overbalance that commonly occurs on gliders at large sideslip angles.

The sailplanes flown illustrated the ways in which stalling behavior desirable for sailplanes differs from that desirable for power planes. First, pre-stall warning was found to be of little or no value because of the normal course of thermalling, the stall boundary is commonly exceeded--an alarm quickly loses its value when often sounded. In any case, regardless of the presence or absence of any pre-stall warning, the considerable loss of climb that would result from reacting to every momentary gust-induced stall warning is unacceptable to most sailplane pilots. They will maneuver as the thermal demands and accept brief occasional stalls. Because occasional stalls must be accepted, it is important that only the least reduction in angle-of-attack be sufficient to achieve an immediate unstall, and that very little loss in altitude and very minor upset accompany the stall. Fortunately, this was just the behavior observed for all the sailplanes except sailplane 6 which had considerable altitude loss and some roll and yaw upset. For deeper or more prolonged or abused stalls, traditional criteria appeared acceptable. Thus, a modification to the traditional criteria such that the initial stall replaced buffet as a warning, and the deeper or aggravated stall be treated as the stall for purposes of certification.

The drag modulation observed on the test sailplanes was felt to be generally insufficient and the operating forces for the drag devices were felt to be generally undesirable for both flaps and airbrakes. Additionally, the variation of divebrake or flap effectiveness during the flare, float and touchdown phase was felt to degrade the pilots' ability to control his landing accuracy. In view of the importance of accurate landings for sailplanes, it was felt that a rational basis should be established for future criteria.

4. CONCLUDING REMARKS

The handling qualities of six sailplanes were evaluated by seven pilots in a flight test session consisting of 98 flights. The term "handling qualities" was defined to be those broad characteristics or attributes which influence the ease and precision with which the pilot is able to perform tasks for the overall mission of the sailplane. In this context the evaluation pilots were instructed to regard cross-country flight under visual flight rules as the principal mission of the sailplane.

Sailplane characteristics were evaluated using the Cooper-Harper rating scale with additional comments. The pilot opinion data indicates the following:

1. The evaluation sailplanes were found generally deficient in the area of cockpit layout. Poor cockpit ventilation, the use of curved control stick, confusing secondary control handles and the need for better cockpit crashworthiness were cited as reasons for deficiency.
2. The pilots indicated general dissatisfaction with pitch sensitivity which in some cases was coupled with inertially induced stick forces. While all sailplanes were judged satisfactory for centering thermals and in the ease of speed control in circling flight, pilot opinions diverged on the maneuvering response, pull-out characteristics from a dive, and on phugoid damping. The pilots found that the tendency to return to trim airspeed is relatively unimportant for visual flight.
3. Lateral-directional control problems were noted mainly during takeoff and landing. Pilot comments indicate the desirability of overall improvements in roll response quickening, increasing roll control power and reduction in the rudder coordination requirement. Existing levels of rudder overbalance or "rudder lock" was not found unsafe or even annoying.
4. Five of the evaluation sailplanes had very narrow airspeed band in which perceptible stall warning buffet occurred. This was not objectionable, however, since stall recovery was easy. The pilots objected to the characteristics of wide airspeed band of stall warning followed

by a stall with yawing and rolling tendency and substantial loss of altitude during the stall.

5. Landing characteristics of the evaluation sailplanes were found generally objectionable. Ineffective divebrakes, and the necessity of exerting a force to restrain divebrake control lever were quoted by some of the pilots. Flap type glide path control was also rated deficient due to the large attitude changes accompanying flap deflections and to the excessive flap actuation forces.

The present study shows the need for a more quantitative investigation of the factors influencing pitch control sensitivity such as precise measurements of stick forces due to both the aerodynamic hinge moments and the bobweight effects arising from the different horizontal tail configurations. Further study is required of lateral-directional control during takeoff and landing. More quantitative information should be gathered also on the various glide path control systems and the interaction of glide path controls with primary flight controls.

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Appendix A
Pilots' Questionnaire

Appendix A.
Questionnaire

SAILEPLANE EVALUATION

Pilot _____ Sailplane _____

Date _____ Flight No. _____

I. Design. ☐

A. Pilot Opinion of Construction & Rigging. ☐

1. Ease of Inspection. ☐

2. Safety of Control System. ☐

3. Ease of Assembly. ☐

4. Comments _____

B. Pilot Opinion of Cockpit Layout. ☐

1. Pilot Comfort. ☐

2. Control System Arrangement. ☐

3. Instrument Display. ☐

4. Pilot Visibility. ☐

5. Pilot Safety. ☐

6. Comments _____

II. Smooth Air Maneuvering. ☐

A. Pilot Opinion of Initial Takeoff Roll. ☐

1. Towline Hookup. ☐

2. Control of Sailplane During Initial Roll. . ☐

3. Comments _____

B. Pilot Opinion of Tow. ☐

1. Ease of Maintaining Position. ☐

2. Aircraft Trim. ☐

3. Control in Propwash. ☐

4. Release Characteristics. ☐

5. Comments _____

C. Pilot Opinion of Longitudinal Handling. ☐

1. Ease of Establishing and Maintaining a
Constant Airspeed. ☐

2. Sailplane Trim System Over Speed Range. . . ☐

3. Pitch Sensitivity. ☐

4. Stick Force Gradient. ☐

5. Stick Fixed Stability. ☐

- 6. Stick Free Stability. ☐
- 7. Return to Trim. ☐
- 8. Maneuvering Response. ☐
- 9. Phugoid Characteristics. ☐
- 10. Dive Recovery. ☐

11. Comments _____

D. Pilot Opinion of Lateral Handling. ☐

- 1. Aileron Force Gradient. ☐
- 2. Rudder Force Gradient. ☐
- 3. Roll Rate Over Speed Range. ☐
- 4. Sideslip Characteristics. ☐
- 5. Ease of Turn Entry. ☐
- 6. Yaw Due to Aileron. ☐
- 7. Yaw Due to Roll. ☐
- 8. Ease of Maintaining 45° Bank Turn. ☐
- 9. Ease of Maintaining 60° Bank Turn. ☐

10. Comments _____

E. Pilot Opinion of Sailplane Stall-Spin Characteristics ☐

1. Rudder and Aileron Effectiveness During Stall ☐
2. Stall Warning. ☐
3. Aggravated Stall-Tendency to Spin. ☐
4. Stick Force Gradient. ☐
5. Stall Recovery, Altitude Loss. ☐
6. Spin Entry. ☐
7. Spin Recovery. ☐
8. Stall From Turn at Low Speed. ☐

9. Comments _____

F. Pilot Opinion of Sailplane Landing Characteristics. ☐

1. Pilot Visibility. ☐
2. Glide Slope Control. ☐
3. Airspeed Control, Airbrake Ease of Modulation ☐
4. Ease of Landing at Intended Spot. ☐
5. Ease of Controlling Sink at Touchdown. . . . ☐
6. Control During Rollout. ☐

7. Comments _____

III. Flight Characteristics in Convection.

☐

A. Pilot Opinion of Tow.

☐

1. Ease of Maintaining Position.

☐

2. Response to Vertical Currents.

☐

3. Release.

☐

4. Comments _____

B. Pilot Opinion of Circling Flight.

☐

1. Low Speed Handling.

☐

2. Stall-Spin Susceptibility.

☐

3. Ease of Centering Thermal.

☐

4. Speed Control.

☐

5. Comments _____

C. Pilot Opinion of Cruising Flight.

☐

1. Ease of Controlling Airspeed.

☐

2. Pull up into Thermal.

☐

3. Ease of Performing Secondary Tasks.

☐

4. Ride Quality. ☐

5. Ease of Maintaining Straight Flight. ☐

6. Comments _____

Appendix B
Cooper Harper Ratings and Pilots' Comments

***** ZEROS INDICATE NO RATING BY PILOT *****

SAILPLANE 1 DATA

TASK	DESCRIPTION OF TASKS	1	2	3	PILOT	5	6	7	AVER.	STD DEV
1	1. DESIGN									
2	A. PILOT OPIN. OF CONST. & RIGGING									
3	1. EASE OF INSPECTION	.00	.00	3.00	.00	.00	2.00	.00	2.500	.500
4	2. EASE OF CONTROL SYSTEM	.00	4.00	3.00	.00	.00	1.00	.00	2.000	1.000
5	3. EASE OF ASSEMBLY	.00	2.00	3.00	.00	.00	2.00	.00	2.000	.000
74	AVER. AND STD. DEV. OF SUBTASKS(EX 1,2,...)	.0	.0	2.7	.9	2.7	.5	.0	.0	2.4

COMMENTS

TASK	PILOT	COMMENTS
2	3	NOT AS GOOD AS GLASS SHIPS
3	3	HAVE TO REMOVE OVERWING FAIRING
4	3	GOOD
5	3	MODERATELY EASY
74	3	AFTER ASSEMBLY, INSPECTION IS DIFFICULT AT ELEVATOR AND WING PINS
74	3	/AILERON CONNECTION

SAILPLANE 2 DATA

TASK	DESCRIPTION OF TASKS	1	2	3	PILOT	5	6	7	AVER.	STD DEV
1	1. DESIGN									
2	A. PILOT OPIN. OF CONST. & RIGGING									
3	1. EASE OF INSPECTION	2.00	1.00	3.00	.00	.00	2.00	.00	2.000	.707
4	2. EASE OF CONTROL SYSTEM	1.50	1.00	1.00	.00	.00	2.00	.00	1.375	.415
5	3. EASE OF ASSEMBLY	2.00	2.00	3.00	.00	.00	2.00	.00	1.500	.500
74	AVER. AND STD. DEV. OF SUBTASKS(EX 1,2,...)	1.00	1.00	1.00	.00	.00	2.00	.00	1.250	.433
74		1.3	.5	1.3	.5	1.7	.9	.0	.0	1.7

COMMENTS

TASK	PILOT	COMMENTS
74	3	EXCELLENT
74	3	APPEARS MECHANICALLY OF MARGINAL DURABILITY
74	3	POSSIBLE TO GET AILERON MOVEMENT WITH DISCONNECTED PUSH RODS
74	3	OUTSTANDING
74	3	HAD POOR HISTORY FOR RUDDER ACTIVATION SYSTEM. ELEVATOR, AILERON
74	3	AND FLAP SYSTEM IS EXCELLENT
74	3	AILERONS CONTROL RODS ENDS, CAN BE INSTALLED BUT NOT PINNED.
74	3	OTHERWISE IT IS BY FAR THE BEST ASSEMBLY OF ANY SAILPLANE.

SAILPLANE 3 DATA

TASK	DESCRIPTION OF TASKS	1	2	3	PILOT	5	6	7	AVER.	STD DEV
1	1. DESIGN									
2	A. PILOT OPIN. OF CONST. & RIGGING									
3	1. EASE OF INSPECTION	2.00	1.00	2.00	.00	.00	3.00	.00	2.000	.707
4	2. EASE OF CONTROL SYSTEM	2.00	2.00	2.00	.00	.00	3.00	.00	2.250	.433
5	3. EASE OF ASSEMBLY	1.00	2.00	1.00	.00	.00	2.00	.00	1.750	.433
74	AVER. AND STD. DEV. OF SUBTASKS(EX 1,2,...)	1.7	.5	2.0	.0	1.7	.5	.0	.0	2.1

COMMENTS

TASK	PILOT	COMMENTS
74	3	EXCELLENT
74	3	NOT AS EASY AS SAILPLANE 2 OR 5
74	3	UNABLE TO VISUALLY INSPECT AILERON CONNECTORS BEHIND SPAR
74	3	EXCELLENT
74	3	QUALITY OF CONSTRUCTION IS EXCELLENT--AILERON AND AIR BRAKE LINKAGES

SAILPLANE 4 DATA

TASK	DESCRIPTION OF TASKS	1	2	3	PILOT	5	6	7	AVER.	STD DEV
1	DESIGN OF OPIN. OF CONST. & RIGGING	.00	.00	.00	.00	.00	.00	.00	5.000	1.000
2	A. PLAN OF INSPECTION	.00	.00	.00	.00	.00	.00	.00	5.000	.500
3	1. LEASURY OF INSTRUMENT SYSTEM	.00	.00	.00	.00	.00	.00	.00	5.000	1.500
4	2. LEASURY OF INSTRUMENT SYSTEM	.00	.00	.00	.00	.00	.00	.00	5.000	1.500
5	3. LEASURY OF INSTRUMENT SYSTEM	.00	.00	.00	.00	.00	.00	.00	5.000	1.500
74	AVR. AND STD. DEV. OF SURTASKS(FX 1+2+...)	.0	.0	.0	4.7	1.2	.0	.0	3.7	1.49

COMMENTS

[illegible]

SAILPLANE 5 DATA

TASK	DESCRIPTION OF TASKS	1	2	3	PILOT _u	5	6	7	AVER.	STD DEV
1.	DESIGN NOT OPIN. OF CONST. & RIGGING	2.00	1.00	3.00	.00	.00	3.00	.00	2.000	.000
2.	A. PLAN OF INSPECTION	2.00	1.00	3.00	.00	.00	3.00	.00	1.875	.217
3.	1. EASE OF OPERATION	2.00	2.00	1.00	.00	.00	2.00	.00	1.750	.433
4.	2. EASE OF CONTROL SYSTEM	2.00	2.00	2.00	.00	.00	2.00	.00	1.750	.433
5.	3. EASE OF ASSEMBLY	2.00	2.00	2.00	.00	.00	2.00	.00	2.000	.000
74.	AVER. AND STD. DEV. OF SUBTASKS (EX 1,2,3,4)	1.7	5.2	0	1.7	5	0	0	1.8	.39

COMMENTS

OUTSTANDING
EXCELLENT CONSTRUCTION-FAIRLY LARGE SHIPS
HORIZONTAL TAIL SURFACE ATTACHMENT UNDERSTOOD
HEAVY BUT SIMPLE ONCE TECHNIQUE IS

SAIL PLANE 6 DATA

TASK	DESCRIPTION OF TASKS	1	2	3	PILOT n	5	6	7	AVER.	STD DEV
1	I. DESIGN	.00	.00	.00	.00	.00	.00	.00	4.500	2.500
2	A. PILOT OPIN. OF CONST. & RIGGING	.00	.00	2.00	.00	.00	7.00	.00	5.000	1.500
3	1. EASEY OF INSPECTION	.00	.00	.00	.00	.00	.00	.00	5.000	1.000
4	2. EASEY OF CONTROL SYSTEM	.00	.00	.00	.00	.00	3.00	.00	5.000	1.000
5	3. EASEY OF ASSEMBLY	.00	.00	5.00	.00	.00	7.00	.00	6.000	1.000
74	AVER. AND STD. DEV. OF SUBTASKS(EX 1,2,...)	.00	.00	.00	3.3	1.2	.0	.0	3.7	1.80

COMMENTS

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EXCELLENT DESIGN, RIGGING IS MORE DIFFICULT THAN MOST, GOOD
GOOD SOLID CONTROL SYSTEM.
SAFE IS SIMPLY NOT DESIGNED FOR ASSEMBLY/DISASSEMBLY
SHIP IS NECESSARY FOR A SAILPLANE.

SAILPLANE 1 DATA

[illegible][illegible]

TASK	DESCRIPTION OF TASKS	1	2	PILOT	3	4	5	6	7	AVER.	STD DEV						
6	B. PILOT OPTION OF COCKPIT LAYOUT	2.00	1.00	3.00	3.00	.00	.00	1.00	3.00	1.893	.748						
7	1. CONTROL SYSTEM ARRANGEMENT	2.00	1.00	3.00	3.00	.00	.00	1.00	3.00	1.724	.744						
8	2. INSTRUMENT DISPLAY	1.00	1.00	2.00	2.00	.00	.00	.00	.00	1.000	.000						
9	3. PILOT VISIBILITY	3.00	3.00	3.00	3.00	.00	.00	1.00	3.00	1.857	.748						
10	4. PILOT SAFETY	3.00	3.00	3.00	3.00	.00	.00	1.00	3.00	1.500	.500						
11	5. PILOT SAFETY	3.00	3.00	3.00	3.00	.00	.00	1.00	3.00	1.500	.500						
75	AVER. AND STD. DEV. OF SUBTASKS(EX 1,2,...)	2.0	.9	1.7	.8	2.0	.6	1.8	1.0	2.0	.9	3.4	1.9	2.2	1.6	2.2	1.09

TASK	PILOT	COMMENTS
7	0	VERY GOOD, BETTER THAN SAILPLANE 2. COULD USE MORE VENTILATION
8	0	CONTROL STICK, RELEASE LEVER TOO FAR FWD.
8	0	EXCELLENT
8	0	TOW RELEASE HARD TO REACH, BRAKE A LITTLE AWKWARD TO REACH, ELEVATOR OFFSET SO THAT POSITIVE G/L GIVES UP ELEVATOR INPUT, VERY
9	0	BAU AT SPEED.
9	0	VISIBILITY FWD COULD BE IMPROVED
9	0	NOT EVALUATED
10	0	FWD AND DOWN SLIGHTLY OBSCURED
10	0	VERY GOOD
11	1	COCKPIT CONSTRUCTION MINIMAL IN STRENGTH
11	1	GLASS FUSELAGE POOR ENERGY ABSORBER
11	1	NOT AS GOOD AS SAILPLANE 4
11	1	SEAT BELT INSTALLATION WAS SUCH THAT SEAT BELT ADJUSTMENT WAS
11	1	DIFFICULT. PROBABLY IMPOSSIBLE IN FLIGHT. BROKEN BUT FEELINGS
11	1	WENT OFF RUNWAY AND OVER A DITCH. NOTHING
11	1	SEAT BELT A LITTLE LOOSE, SO BOUNCED HEAD ON CANOPY. SEAT BELT
11	1	ADJUSTMENT DIFFICULT.
11	1	ADDITIONAL NOSE STRENGTH SHOULD BE ADDED TO PROTECT PILOT'S FEET/LEGS
11	1	IN CASE OF BAD LANDING.
11	1	INSTRUMENT PANEL TOO FAR FWD. ACTUALLY WITH CUSHIONS, THE PANEL
11	1	IS NOT DIRECTLY VISIBLE.
11	1	WOULD BE ACCESSIBLE FROM PEOPLE WITH SHORT REACH. ON CONTROL STICK
11	1	AWKWARD TO APPLY FULLY WITHOUT MOVING HAND ON CONTROL COLUMN
11	1	PRIM LOCK OF ADJUSTMENT EXCELLENT
11	1	AND EAT OF ADJUSTMENT EXCELLENT
11	1	CANNOT REACH TOW RELEASE
11	1	PANEL! TRIM CONTROL TIRING AND VIBRATING TO USE.
11	1	ROPE! CANNOT REACH SWITCHES ON FWD

[illegible][illegible]

***** ZEROS INDICATE NO RATING BY PILOT *****

SAILPLANE 5 DATA

TASK	DESCRIPTION OF TASKS	1	2	PILOT 3	4	5	6	7	AVER.	STD DEV
6	B. PILOT OPINION OF COCKPIT LAYOUT	2.50	2.00	2.00	.00	.00	1.00	1.00	1.700	.600
7	1. PILOT COMFORT	1.00	2.00	2.00	.00	.00	1.00	1.00	1.400	.490
8	2. CONTROL SYSTEM ARRANGEMENT	1.00	2.00	2.00	.00	.00	1.00	1.00	2.750	1.479
9	3. INSTRUMENT DISPLAY	1.00	2.00	2.00	.00	.00	1.00	1.00	1.600	.490
10	4. PILOT VISIBILITY	3.00	2.00	1.00	.00	.00	3.00	1.00	2.000	.894
11	5. PILOT SAFETY	3.00	3.00	3.00	.00	.00	6.00	.00	3.750	1.299
75	AVER. AND STD. DEV. OF SUBTASKS(EX 1,2,...)	2.2	1.0	2.2	.4	2.0	.6	.0	.0	2.2

TASK PILOT

COMMENTS

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DRAG CHUTE DEPLOYMENT LEVER IN ANKWARD POSITION
CONTROL STICK AND RELEASE LEVER TOO FAR FWD
VERY LARGE COMFORTABLE COCKPIT GENERALLY WELL LAYD OUT. TRIMMER IS
HARD TO OPERATE AND HIGHLY ANNOYING. DRAG CHUTE KNOR SUSCEPTIBLE
TO INADVERTENT OPERATION.
EXCELLENT COCKPIT LAYOUT
ELEVATOR OFFSET SO AS TO GIVE MOMENTUM TO UP ELEVATOR WHEN YOU HIT
A POSITIVE LG. TOW RELEASE TOO FAR FWD.
END VISIBILITY MARGINAL DURING TOW
EXCELLENT VIEW OF TOWPLANE OK, BUT COULD BE IMPROVED.
COCKPIT CONSTRUCTION MINIMAL IN STRENGTH
NOT AS SAFE AS SOME
EXCESSIVE BALLAST IN NOSE COULD BE CONVERTED INTO GLASS TO IMPROVE
PILOT'S LEG PROTECTION.
PILOT COMFORT IS EXCELLENT. VENTILATION SHOULD RE BETTER. VENT AIR
CAUSAL SHOULD HAVE BEEN PROVIDED.
EXCELLENT CONTROL PLACEMENT, SEAT DESIGN AND VISIBILITY. FLAP AND
SPEED BRAKE CONTROLS ARE WELL LOCATED AND CONVENIENT TO USE.

SAILPLANE 6 DATA

TASK	DESCRIPTION OF TASKS	1	2	PILOT 3	4	5	6	7	AVER.	STD DEV
6	B. PILOT OPINION OF COCKPIT LAYOUT	.00	.00	3.00	.00	.00	1.00	.00	2.000	1.000
7	1. PILOT COMFORT	.00	2.00	3.00	1.00	1.00	1.00	3.00	1.667	.745
8	2. CONTROL SYSTEM ARRANGEMENT	.00	2.00	3.00	3.00	1.00	4.00	1.00	2.667	.943
9	3. INSTRUMENT DISPLAY	.00	2.00	3.00	2.00	2.00	3.00	2.00	2.800	.748
10	4. PILOT VISIBILITY	.00	2.00	1.00	2.00	1.00	2.00	4.00	1.667	.471
11	5. PILOT SAFETY	.00	1.00	1.00	1.00	1.00	1.00	1.00	1.000	.000
75	AVER. AND STD. DEV. OF SUBTASKS(EX 1,2,...)	.0	.0	1.7	.4	2.0	.9	1.8	.7	1.6

TASK PILOT

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EXCELLENT VIEW OF TOWPLANE OK, BUT COULD BE IMPROVED.
COCKPIT CONSTRUCTION MINIMAL IN STRENGTH
NOT AS SAFE AS SOME
EXCESSIVE BALLAST IN NOSE COULD BE CONVERTED INTO GLASS TO IMPROVE
PILOT'S LEG PROTECTION.
PILOT COMFORT IS EXCELLENT. VENTILATION SHOULD RE BETTER. VENT AIR
CAUSAL SHOULD HAVE BEEN PROVIDED.
EXCELLENT CONTROL PLACEMENT, SEAT DESIGN AND VISIBILITY. FLAP AND
SPEED BRAKE CONTROLS ARE WELL LOCATED AND CONVENIENT TO USE.

***** ZEROS INDICATE NO RATING BY PILOT *****

SAILPLANE 1 DATA

TASK	DESCRIPTION OF TASKS	PILOT			5	6	7	AVER.	STD DEV
12	II. SMOOTH AIR MANEUVERING	1.50	1.00	1.00	.00	1.00	.00	1.125	.217
13	A. PILOT OPIN OF INITIAL TAKEOFF RLL	1.00	1.00	1.00	.00	1.00	3.00	1.667	.943
14	1. TOWLINE HOOKUP	1.00	1.00	2.00	.00	1.00	2.00	1.600	.490
15	2. CONTROL OF PLANE IN INIT. ROLL	1.00	1.00	2.00	4.50	1.00	2.00	1.786	1.191
76	AVER. AND STD. DEV. OF SUBTASKS(EX 1,2,...)	1.0	.0	1.0	.0	3.2	1.3	1.0	.0 1.7

COMMENTS

TASK	PILOT	COMMENTS
76	3	EXCELLENT CHARACTERISTICS IN THIS PHASE OF THE FLIGHT
76	5	ON ONE TOW I HAD FULL FORWARD STICK AND WAS STILL GOING UP WHILE
76	7	TOWPLANE WAS STILL ON GROUND. PROBABLY SHOULD HAVE RELEASED.
76	7	NO PROBLEMS IN TAKE OFF, INCLUDING LIGHT CROSSWIND 9KTS, 45DEG TO RWY

SAILPLANE 2 DATA

TASK	DESCRIPTION OF TASKS	PILOT			5	6	7	AVER.	STD DEV
12	II. SMOOTH AIR MANEUVERING	2.00	2.00	3.00	.00	2.00	3.00	2.400	.490
13	A. PILOT OPIN OF INITIAL TAKEOFF RLL	1.50	2.00	3.00	.00	4.00	2.00	2.750	.990
14	1. TOWLINE HOOKUP	1.00	2.00	2.00	.00	3.00	2.00	2.167	.687
15	2. CONTROL OF PLANE IN INIT. ROLL	2.00	2.00	4.00	4.00	4.00	2.00	3.143	.990
76	AVER. AND STD. DEV. OF SUBTASKS(EX 1,2,...)	1.5	.5	2.0	.0	3.0	1.0	4.0	.0 3.5

COMMENTS

TASK	PILOT	COMMENTS
76	2	SOME TENDENCY TO DROP WING AT START. DON'T LIKE TO HAVE TO MOVE
76	3	FLAPS DURING T.O. ROLLTOP AT START, TO NEUTRAL FLAP OPERATING
76	3	HANDRE IS EXCELLENT.
76	3	THERE IS A TENDENCY TO DROP A WING ON ROLLOUT. STICK LOCATION IS
76	3	INSUFFICIENT. RUDDER, LOCATION OF CONTROL STICK, CONTROL STICK SHORT
76	3	RESULTED IN POORLY CONTROLLED INITIAL ROLL. FELT LIKE NOT ENOUGH
76	3	RUDDER. ALWAYS DRAGGED STICK TOO FAR FORWARD. IN THE NEGATIVE
76	3	ALL DRAGS TO BE SPECIFIED AT FIRST EVEN WITH FLAPS IN. THE NEGATIVE
76	3	NO PROBLEMS IN TAKEOFF, INCLUDING LIGHT CROSSWIND 19KTS, 785RAD TO RW

***** ZEROS INDICATE NO RATING BY PILOT *****

SAILPLANE 3 DATA

TASK	DESCRIPTION OF TASKS	1	2	PILOT 3	4	5	6	7	AVER.	STD DEV			
12	II. SMOOTH AIR MANEUVERING	3.00	.00	2.00	.00	.00	2.00	.00	2.333	.471			
13	A. PILOT OPIN. OF INITIAL TAKEOFF RLL	2.00	3.00	2.00	2.00	2.00	4.00	3.00	2.671	.728			
14	1. CONTROL OF PLANE IN INIT. ROLL	3.00	3.00	1.00	.00	2.00	4.00	3.00	2.333	.923			
15	2. CONTROL OF PLANE IN INIT. ROLL	2.00	4.00	2.00	2.00	2.00	3.00	3.00	2.571	.728			
76	AVER. AND STD. DEV. OF SUBTASKS(EX 1,2,...)	2.5	.5	3.0	1.0	1.5	.5	2.0	.0	3.5	.5	2.5	.84
TASK	PILOT	COMMENTS											
13	6	PILOT USUALLY PUMPS ELEVATOR											
14	5	POOR LOCATION											
14	1	PULLED ON ROPE EXTENSION BECAUSE HANDLE TOO FAR FWD.											
15	1	VISIBILITY AND DIRECTIONAL CONTROL LIMITED											
15	1	CROSS WIND CAPABILITY MARGINAL											
15	1	6,7,9 DIVERGES, TOO DANGEROUS, EXTREME											
15	1	RUDDER WEAK DURING ROLL. EASY TO DROP WING TO GROUND											
76	3	NO PROBLEM WITH INITIAL TAKEOFF ROLL											
76	4	ON TAKEOFF ROLL WITH AIR VENT OPEN, SAND AND ROCKS WERE FLOWN											
76	4	THROUGH THE VENT INTO THE COCKPIT BY THE TOWPLANE.											

SAILPLANE 4 DATA

TASK	DESCRIPTION OF TASKS	1	2	PILOT 3	4	5	6	7	AVER.	STD DEV	
12	II. SMOOTH AIR MANEUVERING	.00	.00	2.00	.00	2.00	2.00	2.00	2.000	.000	
13	A. PILOT OPIN. OF INITIAL TAKEOFF RLL	.00	3.00	6.00	1.00	2.00	2.00	2.00	2.667	1.599	
14	1. CONTROL OF PLANE IN INIT. ROLL	.00	1.00	2.00	1.00	2.00	2.00	2.00	1.167	.373	
15	2. CONTROL OF PLANE IN INIT. ROLL	.00	3.00	2.00	1.00	2.00	2.00	2.00	2.000	.577	
76	AVER. AND STD. DEV. OF SUBTASKS(EX 1,2,...)	.0	.0	2.0	1.0	2.0	.0	1.0	.5	1.5	.64
TASK	PILOT	COMMENTS									
14	3	EXCELLENT AERODYNAMICALLY, CONFUSING FOR PILOT SINCE HE ALWAYS PULLS									
14	3	RELEASE FOR HOOKUP.									
14	3	GOOD									
15	2	REQUIREMENT TO START T.O. WITH FLAP UP, THEN PUT NEUTRAL IS									
15	2	UNDESIRABLE, SOME TENDENCY TO DROP WING AT START OF ROLL									
15	2	WHEN THE TAILWHEEL BECOMES TAUT									
15	2	THERE IS ADEQUATE CONTROL DURING T.O. TO MAINTAIN WINGS LEVEL EVEN									
15	2	IN CROSSWINDS OF AT LEAST 10KTS.									
15	2	IS ABOUT TWICE THE AFT BREAKOUT FORCE, WHEN THE STICK IS MOVED AFT									
15	2	TO FWD, THE FWD BREAKOUT FORCE IS RELATIVELY SO HEAVY THAT IT FEELS									
15	2	AS IF A STOP HAS BEEN ENCOUNTERED. THIS UNBALANCED BREAKOUT FORCE									
15	2	CAUSED ME TO OVERCONTROL IN PITCHDOWN ON ONE TAKEOFF. IT HAS BEEN									
15	2	SUGGESTED (PILOT 4) THAT WITH LONG, TRIM CONTROL ALMOST FULL FWD.									
15	2	(AS REQD ON T.O.), BREAKOUT FORCES ARE UNEVEN FORE AND AFT AS AN									
15	2	INHERENT CHARACTERISTIC OF THE FEEL SPRING MECHANISM.									

TASK	DESCRIPTION OF TASKS	1	2	PILOT	4	5	6	7	AVER.	STD	DEV
12	II. SMOOTH AIR MANEUVERING	2.00	5.00	2.00	.00	.00	2.00	4.00	3.000	1.265	
13	A. PILOT OPIN OF INITIAL TAKEOFF RLL	2.00	4.00	2.00	.00	.00	2.00	4.00	2.000	1.000	
14	1. CONTROL OF PLANE IN INIT. ROLL	2.00	4.00	2.00	.00	.00	2.00	4.00	2.000	1.000	
15	2. CONTROL OF PLANE IN INIT. ROLL	2.00	4.00	2.00	.00	.00	2.00	4.00	2.000	1.000	
76	AVR. AND STD. DEV. OF SUBTASKS(EX 1,2,...)	2.5	5.3	0.1	0.0	0.0	4.5	2.0	2.8	1.17	

TASK	PILOT	COMMENTS
13	00	RUDDER INEFFECTIVE, FLAP/AILERON MOVEMENT NECESSARY TO CONTROL
13	00	WING LEVEL
14	10	POOR LOCATION
14	10	TOW RELEASE TOO FAR FROM PILOT'S SHOULDER. TOW HOOK TOO FAR AFT
14	10	CAUSING PITCH UP TENDENCY
14	10	WING STABILITY--DIRECTIONAL CONTROL LIMITED
15	10	AILERONS WEAK, RUDDER WEAK, LIMITED CROSSWIND CAPABILITY
15	10	THE USE OF UP-FLAP TO IMPROVE AILERONS IN CROSSWIND IS AN UNDESIRABLE
76	10	PROCEDURAL COMPLICATION. THE UNBALANCED LONGITUDINAL CONTROL
76	10	CIRCUIT CAUSES THE STICK TO BOUNCE FORE AND AFT WHILE ROLLING OVER
76	10	BUMPY GROUND
76	10	NO SIGNIFICANT PROBLEMS. SLIGHT BOUNCE ON TAKEOFF WHICH COULD BE
76	10	ATTRIBUTED TO WING FLEXING. PROBABLY IT WAS PILOT ERROR. IN ANY
76	10	CASE, AFTER LIFTOFF, TOWPLANE SHOULD BE FOLLOWED HIGHER THAN WITH
76	10	OTHER SAILPLANES.
76	10	CROSSWINDS A MAJOR PROBLEM. MAX VECTOR PROBABLY ABOUT 15KNOTS.
76	10	NO PROBLEMS ON TAKEOFF (STEARNMAN TOW)

TASK	DESCRIPTION OF TASKS	1	2	PILOT	3	4	5	6	7	AVER.	STD DEV				
12	II. SMOOTH AIR MANEUVERING	.00	1.00	1.00		.00	.00	2.00	1.00	1.250	.433				
13	A. PILOT OUT OF INITIAL TAKEOFF RLL	.00	1.00	1.00		.00	.00	1.00	1.00	1.000	.000				
14	1. CONTROL OF HOOPSUP	.00	4.00	1.00		.00	.00	2.00	2.00	1.667	.667				
15	2. CONTROL OF PLANE IN INIT. ROLL	.00	4.00	1.00		.00	.00	2.00	2.00	1.667	.667				
76	AVR. AND STD. DEV. OF SUBTASKS(EX 1,2,...)	.0	.0	2.5	1.5	1.5	.5	1.0	.0	3.0	1.0	1.5	.5	1.9	1.04

TASK	PILOT	COMMENTS
13	5	FWD STICKS, THEN NOSE SKID HITS WHEN PILOT OVERCONTROLS PITCH EVER
15	6	SO SLEIGHTLY
16	6	EXCELLENT
76	2	CONTROL DURING INITIAL ROLL AND LIFTOFF
76	3	CONTROL IN ALL AXES FOR TAKEOFF--ADEQUATE AUTHORITY AND
76	7	VERY GOOD RESPONSE.

SAILPLANE 1 DATA

TASK	DESCRIPTION OF TASKS	1	2	PILOT 3	4	5	6	7	AVER. STD DEV
16	B. PILOT OPTION OF TOW	1.50	1.00	2.00	.00	.00	1.00	.00	1.375 .415
17	1: EASE OF MAINTAINING POSITION	1.00	1.00	1.00	2.00	3.00	1.00	1.00	1.429 .728
18	2: AIRCRAFT TRIM	2.00	5.00	1.00	4.00	4.50	4.00	4.00	1.500 1.336
19	3: CONTROL IN PROPWASH	1.00	1.00	1.00	2.00	3.00	1.00	1.00	1.728 .728
20	4: RELEASE CHARACTERISTICS	1.00	1.00	2.00	1.00	2.00	1.00	2.00	1.429 .500
77	77 AVER. AND STD. DEV. OF SUBTASKS(EX 1.2,...)	1.3	.4	2.3	1.2	1.3	.4	2.2	1.1 2.0 1.2 2.0 1.27

TASK	PILOT	COMMENTS
17	4	INSUFFICIENT ELEVATOR TRIM. REQUIRES ABOUT 13N CONSTANT PUSH FORCE
18	6	HEADING DOES NOT HUNT. EXCELLENT FOLLOWING OF TOWPLANE.
19	1	TOO MUCH FORWARD STICK TO MAINTAIN POSITION
20	2	INEFFECTIVE-UNSATISFACTORY
77	3	POOR NONEXISTENT
77	4	MAX TRIM SPEED 45-50KTS, HOWEVER FORCES ARE LIGHT THROUGH SPEED RANGE
77	5	EXCELLENT RESPONSIVE--WELL DAMPED--LIGHT CONTROL FORCES
77	6	EXTREMELY RESPONSIVE--WELL DAMPED--LIGHT CONTROL FORCES
77	7	GOOD HARMONY--OUTSTANDING
77	7	GLIDER CANNOT BE TRIMMED ON TOW. WOULD BE TIRESOME AS A CROSS-COUNTRY TOW
77	7	CONSTANT FORWARD FORCE ON STICK
77	7	TRIM-REQUIRED 13-18N FWD FORCE IN TOW. CONTROL VERY GOOD IN TOW.
77	7	BOXING SAILPLANE IS SIMPLE TASK, WINGS LEVEL(ADEQUATE RUDDER CONTROL)

SAILPLANE 2 DATA

TASK	DESCRIPTION OF TASKS	1	2	PILOT 3	4	5	6	7	AVER. STD DEV
16	B. PILOT OPTION OF TOW	1.00	2.00	3.00	.00	.00	2.00	3.00	2.200 .748
17	1: EASE OF MAINTAINING POSITION	1.00	2.00	2.00	3.00	3.00	2.00	3.00	2.286 .700
18	2: AIRCRAFT TRIM	1.00	3.00	3.00	3.00	3.00	2.00	2.00	2.571 .728
19	3: CONTROL IN PROPWASH	1.00	2.00	2.00	2.00	3.00	2.00	2.00	2.143 .639
20	4: RELEASE CHARACTERISTICS	1.00	.00	2.00	1.00	2.00	2.00	2.00	1.667 .471
77	77 AVER. AND STD. DEV. OF SUBTASKS(EX 1.2,...)	1.0	.0	2.3	.5	2.5	.4	2.2	.4 2.2 .4 2.2 .72

TASK	PILOT	COMMENTS
17	4	INSUFFICIENT RUDDER TO BOX TOWPLANE
18	6	EFFICIENT BUT HARD TO OPERATE
19	1	FRUSTRATION FORCE IS SUFFICIENT
20	2	SUFFICIENT TRIM AVAILABLE HOWEVER EACH DETENT RESULTED IN AT LEAST 4KT INCREMENTS
77	3	DIRECTIONAL--COULD NOT BOX TOW VERY WELL
77	4	FAIRLY LARGE ALLERON DEPLECTIONS ARE REQUIRED.
77	5	ALWAYS NEED PUSH FORCES ON STICK
77	6	GOOD, QUIET
77	7	TOUCHY IN DIRECTIONAL
77	7	SOME CORRECTION REQUIRED FOR DIRECTIONAL-LATERAL CONTROL
77	7	HANDLES EXCELLENTLY. EASILY UPSET BY DRAUGHTS BUT EASILY RESTORED
77	7	BY CONSIDERABLE LIGHT RUDDER FORCES. GEAR RETRACTION FORCES ARE HEAVY,
77	7	PLEASANTABLE. STICK OVERROOT WHEN PULLING BACK TO CENTER FROM,
77	7	THE POINTABLE. CURVED STICK COULD BE THE REASON IN THE
77	7	RUDDER REACT. UNPLEASANT STICK FORCES EXCESSIVE FRICTION. POOR
77	7	VISIBILITY
77	7	HARD TO FLY WAS IN ROUGH AIR. HAD TO WORK TO RETURN TO CORRECT
77	7	POSITION
77	7	NON-STANDARD STICK TOO FAR FORWARD RESULTING IN TROUBLE HOLDING
77	7	NOSE DOWN AT HIGH TOW SPEEDS
77	7	ADAPTABLE RUDDER CONTROL TO BOX TOWPLANE WITH WINGS LEVEL. SMALL BUT
77	7	FREQUENT STICK AND RUDDER INPUTS REQUIRED IN NORMAL TOW.

TASK	DESCRIPTION OF TASKS	1	2	PILOT	4	5	6	7	AVER.	STD DEV
B.	PILOT OPTION OF TOW	2.00	3.00	3.00	3.00	.00	3.00	2.00	2.500	.500
19	EASE OFF MAINTAINING POSITION	2.00	2.00	3.00	3.00	.00	3.00	2.00	2.286	.700
18	WHEEL LEFT TURN	5.00	2.00	3.00	3.00	.00	3.00	1.00	2.429	.400
18	CAN ROPE IN PROPWASH	2.00	2.00	3.00	3.00	.00	3.00	2.00	1.857	.639
20	RELEASE CHARACTERISTICS	1.00	.00	3.00	3.00	3.00	2.00	2.00	2.167	.687
AND STD. DEV.	OF SUBTASKS(FX 1,2,3..)	1.7	2.0	2.2	2.5	2.5	2.5	1.7	2.2	.67

[illegible]

SAILPLANE 4 DATA

TASK	DESCRIPTION OF TASKS	1	2	PILOT	3	4	5	6	7	AVER.	STD DEV
16	B. PILOT OPTION OF TOW	.00	2.00	3.00	.00	2.00	2.00	2.00	2.00	2.000	.400
17	1. EASY TO MANEUVERING POSITION	.00	1.00	3.00	.00	2.00	2.00	2.00	2.00	2.000	.000
18	2. AIRCRAFT IN PROPWASH	.00	2.00	3.00	.00	2.00	2.00	2.00	2.00	2.000	.000
19	3. CONTROL CHARACTERISTICS	.00	2.00	3.00	.00	2.00	2.00	2.00	2.00	2.000	.000
20	4. RELEASE CHARACTERISTICS	.00	.00	3.00	.00	2.00	2.00	2.00	2.00	2.000	.000
21		.00	.00	3.00	.00	2.00	2.00	2.00	2.00	2.000	.000
22		.00	.00	3.00	.00	2.00	2.00	2.00	2.00	2.000	.000
23		.00	.00	3.00	.00	2.00	2.00	2.00	2.00	2.000	.000
24		.00	.00	3.00	.00	2.00	2.00	2.00	2.00	2.000	.000
25		.00	.00	3.00	.00	2.00	2.00	2.00	2.00	2.000	.000
26		.00	.00	3.00	.00	2.00	2.00	2.00	2.00	2.000	.000
27		.00	.00	3.00	.00	2.00	2.00	2.00	2.00	2.000	.000
28		.00	.00	3.00	.00	2.00	2.00	2.00	2.00	2.000	.000
29		.00	.00	3.00	.00	2.00	2.00	2.00	2.00	2.000	.000
30		.00	.00	3.00	.00	2.00	2.00	2.00	2.00	2.000	.000
31		.00	.00	3.00	.00	2.00	2.00	2.00	2.00	2.000	.000
32		.00	.00	3.00	.00	2.00	2.00	2.00	2.00	2.000	.000
33		.00	.00	3.00	.00	2.00	2.00	2.00	2.00	2.000	.000
34		.00	.00	3.00	.00	2.00	2.00	2.00	2.00	2.000	.000
35		.00	.00	3.00	.00	2.00	2.00	2.00	2.00	2.000	.000
36		.00	.00	3.00	.00	2.00	2.00	2.00	2.00	2.000	.000
37		.00	.00	3.00	.00	2.00	2.00	2.00	2.00	2.000	.000
38		.00	.00	3.00	.00	2.00	2.00	2.00	2.00	2.000	.000
39		.00	.00	3.00	.00	2.00	2.00	2.00	2.00	2.000	.000
40		.00	.00	3.00	.00	2.00	2.00	2.00	2.00	2.000	.000
41		.00	.00	3.00	.00	2.00	2.00	2.00	2.00	2.000	.000
42		.00	.00	3.00	.00	2.00	2.00	2.00	2.00	2.000	.000
43		.00	.00	3.00	.00	2.00	2.00	2.00	2.00	2.000	.000
44		.00	.00	3.00	.00	2.00	2.00	2.00	2.00	2.000	.000
45		.00	.00	3.00	.00	2.00	2.00	2.00	2.00	2.000	.000
46		.00	.00	3.00	.00	2.00	2.00	2.00	2.00	2.000	.000
47		.00	.00	3.00	.00	2.00	2.00	2.00	2.00	2.000	.000
48		.00	.00	3.00	.00	2.00	2.00	2.00	2.00	2.000	.000
49		.00	.00	3.00	.00	2.00	2.00	2.00	2.00	2.000	.000
50		.00	.00	3.00	.00	2.00	2.00	2.00	2.00	2.000	.000
51		.00	.00	3.00	.00	2.00	2.00	2.00	2.00	2.000	.000
52		.00	.00	3.00	.00	2.00	2.00	2.00	2.00	2.000	.000
53		.00	.00	3.00	.00	2.00	2.00	2.00	2.00	2.000	.000
54		.00	.00	3.00	.00	2.00	2.00	2.00	2.00	2.000	.000
55		.00	.00	3.00	.00	2.00	2.00	2.00	2.00	2.000	.000
56		.00	.00	3.00	.00	2.00	2.00	2.00	2.00	2.000	.000
57		.00	.00	3.00	.00	2.00	2.00	2.00	2.00	2.000	.000
58		.00	.00	3.00	.00	2.00	2.00	2.00	2.00	2.000	.000
59		.00	.00	3.00	.00	2.00	2.00	2.00	2.00	2.000	.000
60		.00	.00	3.00	.00	2.00	2.00	2.00	2.00	2.000	.000
61		.00	.00	3.00	.00	2.00	2.00	2.00	2.00	2.000	.000
62		.00	.00	3.00	.00	2.00	2.00	2.00	2.00	2.000	.000
63		.00	.00	3.00	.00	2.00	2.00	2.00	2.00	2.000	.000
64		.00	.00	3.00	.00	2.00	2.00	2.00	2.00	2.000	.000
65		.00	.00	3.00	.00	2.00	2.00	2.00	2.00	2.000	.000
66		.00	.00	3.00	.00	2.00	2.00	2.00	2.00	2.000	.000
67		.00	.00	3.00	.00	2.00	2.00	2.00	2.00	2.000	.000
68		.00	.00	3.00	.00	2.00	2.00	2.00	2.00	2.000	.000
69		.00	.00	3.00	.00	2.00	2.00	2.00	2.00	2.000	.000
70		.00	.00	3.00	.00	2.00	2.00	2.00	2.00	2.000	.000
71		.00	.00	3.00	.00	2.00	2.00	2.00	2.00	2.000	.000
72		.00	.00	3.00	.00	2.00	2.00	2.00	2.00	2.000	.000
73		.00	.00	3.00	.00	2.00	2.00	2.00	2.00	2.000	.000
74		.00	.00	3.00	.00	2.00	2.00	2.00	2.00	2.000	.000
75		.00	.00	3.00	.00	2.00	2.00	2.00	2.00	2.000	.000
76		.00	.00	3.00	.00	2.00	2.00	2.00	2.00	2.000	.000
77	AVER. AND STD. DEV. OF SUBTASKS(EX 1,2,..)	.00	.0 1.7	.5 3.0	.7 2.0	.4 2.5	.9 1.7	.4 2.1	.80		
TASK	PILOT										
17	5	THIS AIRPLANE WAS EASY TO LOCK IN POSITION.									
18	6	CONTINUING SPRING IS ANNOYING.									
19	7	ADEQUATE BUT DIFFICULT TO ACTUATE TRIM LEVER TO OBTAIN PRECISE									
20	8	SETTING TRIM WAS VERY GOOD									
21	9	THE TRIM WAS VERY GOOD									
22	10	FELT SOLID BUT NOISY									
23	11	FELT SOLID. NOTED DURING TOW THAT NOSE UP BREAKOUT FORCE LESS THAN									
24	12	NOSE UP DOWN. NOSE DOWN FELT LIKE A LSTOPC.									
25	13	GOOD									
26	14	GOOD									
27	15	HANDLING DURING TOW IS GOOD, ONLY ANNOYING CHARACTERISTIC IS NOISF									
28	16	POSITION OF TRIM LEVER CAUSES UNWANTED PITCH CHANGES(ATTITUDE)									
29	17	STROKING WHEN HITTING A GUST WHICH INCREASES/DECREASES AIRSPEED.									
30	18	ON TOW CONTROL MORE THAN ADEQUATE TO MAINTAIN WING SEMISPAN LATERAL									
31	19	DUEST FROM TOWPLANE WITH WINGS LEVEL									
32	20	OBTAINING MORE THAN ADEQUATE TO MAINTAIN WING SEMISPAN LATERAL									
33	21										
34	22										
35	23										
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GOOD HANDLING DURING TOW IS GOOD, ONLY ANNOYING CHARACTERISTIC IS NOISE
STRONG TOWING FORCE, CAUSES UNWANTED PITCH CHANGES (ATTITUDE)
POSITIONING TRIM, JUST HIGH INCREASES, DECREASES, OR STAYS FLAT
CONTROL HI MORE THAN ADEQUATE TO MAINTAIN WING SEMISPAN LATERAL
CONTROL LO LOWER THAN ADEQUATE TO MAINTAIN WING SEMISPAN LATERAL
RIDER FROM TOW PLANE
RIDER FROM TOW PLANE

***** ZEROS INDICATE NO RATING BY PILOT *****

SAILPLANE 5 DATA

TASK	DESCRIPTION OF TASKS	1	2	PILOT 3	4	5	6	7	AVER.	STD DEV					
16	B. PILOT OPTION OF TOW	2.00	4.50	2.00	.00	.00	4.00	5.00	3.500	1.325					
17	1. EASE OF MAINTAINING POSITION	1.00	3.00	2.00	.00	.00	3.00	2.00	2.800	1.400					
18	2. AIRCRAFT TRIM	2.00	2.00	2.00	.00	.00	3.00	2.00	2.200	.400					
19	3. CONTROL IN PROWASH	1.00	2.00	2.00	.00	.00	3.00	4.00	2.500	1.116					
20	4. RELEASE CHARACTERISTICS	1.00	2.00	2.00	.00	.00	3.00	2.00	1.750	.433					
77	AVER. AND STD. DEV. OF SUBTASKS(EX 1,2,...)	1.3	.4	2.3	.5	2.0	.0	.0	.0	2.7	.4	3.2	1.3	2.3	1.00

COMMENTS

TASK	PILOT	COMMENTS
17	1	FWD VISIBILITY LIMITED
18	1	TRIMMED ON TOW BUT TOWROPE RUBS SIDE OF FUSELAGE DUE TO POS. OF RELEASE
19	1	CONTROL PROBLEM IN TURBULENCE. PILOT WAS FAIRLY CLOSE TO A SERIOUS PITCH
19	1	CONTROL PROBLEM AT TIMES. PILOT INDUCED OSCILLATION. I WAS UNABLE
19	1	TAKE RIGHT HAND WHILE LEFT HAND, EVEN IN SMOOTH AIR.
19	1	AS USUAL, WE THINK A VERY SENSITIVE PITCH CONTROL, I WAS VERY CONSCIOUS
19	1	WOULD BE UNPLEASANT. I LOOKED AT THE NEGATIVE STICK FORCE/ICE GIVES
19	1	TOOK OK AT 70 KTS. HAVING A NEGATIVE STICK FORCE/ICE GIVES
19	1	THE STICK MUST BE RESTAINED IN CENTER POSITION. MOST UNPLEASANT
19	1	ON TOW WHERE PITCH IS LIGHTER.
19	1	INITIAL TOW SPEED 60 KTS. FEEL MORE COMFORTABLE WITH ONE NOTCH DOWN
19	1	FLAPS. NO BOXING OF TOWPLANE WAS ATTEMPTED. VERY EASY TO STAY IN
19	1	POSITION. FEET ON RUDDER PEDALS. YAWS ABOUT ONE WING SPAN TO EITHER
19	1	SIDE OF TOWPLANE. CONTROLLABLE WITH RUDDER.
19	1	POOR HARMONY. VERY SENSITIVE ELEVATOR WITH RELATIVELY HEAVY,
19	1	SLUGGISH AILERONS. BOXING TOW TO SIDE WITH FULL RUDDER. WINGS LEVEL
19	1	ABOUT 1/2 SEMISPAN FROM TOWPLANE

SAILPLANE 6 DATA

TASK	DESCRIPTION OF TASKS	1	2	PILOT 3	4	5	6	7	AVER.	STD DEV					
16	B. PILOT OPTION OF TOW	.00	1.00	2.00	.00	.00	2.00	1.00	1.500	.500					
17	1. EASE OF MAINTAINING POSITION	.00	1.00	2.00	.00	.00	2.00	1.00	1.667	.745					
18	2. AIRCRAFT TRIM	.00	.00	2.00	.00	.00	4.00	1.00	2.400	1.020					
19	3. CONTROL IN PROPWASH	.00	1.00	1.00	.00	.00	2.00	2.00	2.000	.687					
20	4. RELEASE CHARACTERISTICS	.00	1.00	3.00	1.00	.00	2.00	2.00	1.833	.687					
77	AVER. AND STD. DEV. OF SUBTASKS(EX 1,2,...)	.0	.0	1.0	.0	2.0	.7	1.5	.5	2.5	.9	2.0	1.2	2.0	.91

COMMENTS

TASK	PILOT	COMMENTS
17	1	EXCELLENT
18	1	FWD STICK, ARM OUTSTRETCHED
19	1	GOOD ENOUGH NOSE DOWN TRIM
19	1	NO TAIL WASH AS WITH SINGLE PILOT
19	1	BETTER THAN MOST
19	1	NOT TOO EASY TO TOW. AILERONS OSCILLATE OCCASIONALLY IN PROPWASH
19	1	EX. TURN EASY. THIS IS BETTER THAN OTHERS.
19	1	VERY GOOD TOW CHARACTERISTICS, NOISEY
19	1	RUDDER FOR TOW. HIGH TOW. GOOD HARMONY
19	1	UNABLE TO HOLD TOW POSITION. TO HOLD FWD FORCE CONTINUOUSLY. VERY
19	1	GOOD IN HOLDING STABLE TOW POSITION, HOWEVER.

***** ZEROS INDICATE NO RATING BY PILOT *****

SAILPLANE 1 DATA

TASK	DESCRIPTION OF TASKS	1	2	PILOT	4	5	6	7	AVER.	STD DEV							
21	C. PILOT OPINION OF LONG. HANDLING	2.00	1.00	1.00	3.00	3.00	1.00	1.00	1.250	.433							
22	EASE OF ENTRY & MAIN CONTROLS	3.00	1.00	1.00	3.00	3.00	1.00	1.00	1.571	.904							
23	PLANE TRIMMING	3.00	1.00	1.00	3.00	3.00	1.00	1.00	1.571	.904							
24	PLANE TRIMMING	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.286	.495							
25	STICK FORCE GRADIENT	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.571	.904							
26	STICK FORCE GRADIENT	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.571	.904							
27	STICK FORCE GRADIENT	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.571	.904							
28	STICK FORCE GRADIENT	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.571	.904							
29	STICK FORCE GRADIENT	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.571	.904							
30	STICK FORCE GRADIENT	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.571	.904							
31	STICK FORCE GRADIENT	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.571	.904							
78	AVR. AND STD. DEV. OF SUBTASKS (EX 1,2,...)	1.5	.8	1.6	1.3	1.6	.7	1.6	1.1	2.3	.6	1.6	1.0	2.1	.8	1.7	.96

TASK	PILOT	COMMENTS
21	4	EASY TO OBTAIN, BUT HAD TO HOLD A FORCE AT SPEEDS ABOVE 48KTS.
22	3	VERY EASY TASK
23	3	TRIMMER UNSATISFACTORY
24	4	NOT NEEDED
25	4	MAX TRIM SPEED 48KTS.
26	4	COULD ONLY TRIM TO 61 IAS
27	4	INSTEADICENT NOSE DOWN TRIM FOR MAX AIRSPEED
28	4	STEADY STATE SPEED WITH FULL FWD TRIM AT 55KTS-NEEDS FULL TRIM CAP.
29	3	EXCELLENT
30	3	NO PROBLEMS AT ALL IN OVER 161 OR UNDESIRABLE RESPONSE
31	3	EXCELLENT
78	3	VERY GOOD
79	3	VERY GOOD
80	3	TRIMMER INOPERATIVE
81	3	THIS TO ME IS EVIDENCED BY STICK FORCE GRADIENT
82	3	TRIMMER INOPERATIVE BUT PROBABLY WOULD RETURN TO TRIM
83	3	MAXIMUM OF TRIM
84	3	EXCELLENT
85	3	NEUTRALLY STABLE AT 52KTS
86	3	NEUTRAL
87	3	A LITTLE TOO LIGHT STABILITY CAUSES G TO BUILDUP DURING DIVE ACCEL.
88	3	MODERATE STICK FORCE REQUIRED
89	3	1-18NAT IN TURNING FLIGHT AT 52KTS POSITIVE AND OK
90	3	STABILITY INDUCED DURING DIVE RECOVERY LEADS TO EASE OF OVER 6
91	3	EXCELLENT LONGITUDINAL STABILITY, VERY PERCEPTIBLE STICK TRAVEL AND
92	3	FORCE REQUIRED FOR SPEED CHANGE. NON LINEAR RESPONSE DURING PRECISE
93	3	ATTITUDE CHANGE (SLOWER RESPONSE TO PUSH THAN TO PULL).
94	3	STICK FORCE PER 161 EXCELLENT
95	3	STICK FORCE FORWARD
96	3	PITCH-ROLL CONTROL AND RESPONSE HARMONY IS VERY GOOD

SAILPLANE 3 DATA

TASK	DESCRIPTION OF TASKS	1	2	PILOT 3	4	5	6	7	AVR.	STD DEV
C. PILOT	OPIN OF LONG. HANDLING	5.00	5.00	3.50	3.00	2.00	5.00	3.00	4.180	1.115
1.	EASE OF EST & MAIN CONTROLS	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.180	1.453
2.	PLANE TRIM SYS OVER SPEED RANGE	4.00	4.00	4.00	4.00	4.00	4.00	4.00	2.533	1.247
3.	PITCH SENSITIVITY	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.714	1.500
4.	STICK FORCED GRADIENT	10.00	10.00	10.00	10.00	10.00	10.00	10.00	2.356	1.030
5.	STICK FREE STABILITY	10.00	10.00	10.00	10.00	10.00	10.00	10.00	2.429	1.377
6.	STICK FREE STABILITY	10.00	10.00	10.00	10.00	10.00	10.00	10.00	2.429	1.377
7.	RETURN TO TRIM	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.714	1.500
8.	MANEUVERING RESPONSE	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.429	1.377
9.	PHUGOID CHARACTERISTICS	10.00	10.00	10.00	10.00	10.00	10.00	10.00	2.714	1.500
10.	DIVE RECOVERY	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.429	1.377
78	AVR. AND STD. DEV. OF SUBTASKS(1,2,...)	4.4	3.7	3.1	1.5	2.5	5.2	7.2	3.1	2.05
TASK	PILOT	3	2	3	4	5	6	7	3.1	2.05
32	POOR OPERATING DEVICE	3	2	3	4	5	6	7	3.1	2.05
33	DURING DECENT AND TRIMMING AT 60IAS AND HOLDING ELEVATOR CONTROL	3	2	3	4	5	6	7	3.1	2.05
34	FIXED-NOSE A +1 KI OSCILLATION. SPEED VARIATION WAS CONFIRMED	3	2	3	4	5	6	7	3.1	2.05
35	BY NOTING SLIGHT A/C OSCILLATION.	3	2	3	4	5	6	7	3.1	2.05
36	VTRIM 50KTS FRICTION BAND LOW 42 HIGH 53, VTRIM 60KTS LOW 48 HIGH 68	3	2	3	4	5	6	7	3.1	2.05
37	VTRIM 70KTS LOW 57 HIGH 73. EASY TO MAINTAIN SPEED.	3	2	3	4	5	6	7	3.1	2.05
38	VTRIM 80KTS LOW 62 HIGH 82. EASY TO MAINTAIN SPEED.	3	2	3	4	5	6	7	3.1	2.05
39	THIS IS FUNNY, BECAUSE IT FEELS GOOD, BUT CAN'T TAKE HAND OFF FOR LONG	3	2	3	4	5	6	7	3.1	2.05
40	UNABLE TO TRIM HIGH ENOUGH SPEED. TRIM STOPS ABOUT 80IAS.	3	2	3	4	5	6	7	3.1	2.05
41	TOO SENSITIVE	3	2	3	4	5	6	7	3.1	2.05
42	FAIRLY SENSITIVE, BUT LACK OF FORCE GRADIENT CAUSED SOME DIFFICULTY	3	2	3	4	5	6	7	3.1	2.05
43	VERY SENSITIVE, BUT LACK OF FORCE GRADIENT CAUSED SOME DIFFICULTY	3	2	3	4	5	6	7	3.1	2.05
44	ANY SENSITIVE, BUT LACK OF FORCE GRADIENT CAUSED SOME DIFFICULTY	3	2	3	4	5	6	7	3.1	2.05
45	ANY SENSITIVE, BUT LACK OF FORCE GRADIENT CAUSED SOME DIFFICULTY	3	2	3	4	5	6	7	3.1	2.05
46	ANY SENSITIVE, BUT LACK OF FORCE GRADIENT CAUSED SOME DIFFICULTY	3	2	3	4	5	6	7	3.1	2.05
47	ANY SENSITIVE, BUT LACK OF FORCE GRADIENT CAUSED SOME DIFFICULTY	3	2	3	4	5	6	7	3.1	2.05
48	ANY SENSITIVE, BUT LACK OF FORCE GRADIENT CAUSED SOME DIFFICULTY	3	2	3	4	5	6	7	3.1	2.05
49	ANY SENSITIVE, BUT LACK OF FORCE GRADIENT CAUSED SOME DIFFICULTY	3	2	3	4	5	6	7	3.1	2.05
50	ANY SENSITIVE, BUT LACK OF FORCE GRADIENT CAUSED SOME DIFFICULTY	3	2	3	4	5	6	7	3.1	2.05
51	ANY SENSITIVE, BUT LACK OF FORCE GRADIENT CAUSED SOME DIFFICULTY	3	2	3	4	5	6	7	3.1	2.05
52	ANY SENSITIVE, BUT LACK OF FORCE GRADIENT CAUSED SOME DIFFICULTY	3	2	3	4	5	6	7	3.1	2.05
53	ANY SENSITIVE, BUT LACK OF FORCE GRADIENT CAUSED SOME DIFFICULTY	3	2	3	4	5	6	7	3.1	2.05
54	ANY SENSITIVE, BUT LACK OF FORCE GRADIENT CAUSED SOME DIFFICULTY	3	2	3	4	5	6	7	3.1	2.05
55	ANY SENSITIVE, BUT LACK OF FORCE GRADIENT CAUSED SOME DIFFICULTY	3	2	3	4	5	6	7	3.1	2.05
56	ANY SENSITIVE, BUT LACK OF FORCE GRADIENT CAUSED SOME DIFFICULTY	3	2	3	4	5	6	7	3.1	2.05
57	ANY SENSITIVE, BUT LACK OF FORCE GRADIENT CAUSED SOME DIFFICULTY	3	2	3	4	5	6	7	3.1	2.05
58	ANY SENSITIVE, BUT LACK OF FORCE GRADIENT CAUSED SOME DIFFICULTY	3	2	3	4	5	6	7	3.1	2.05
59	ANY SENSITIVE, BUT LACK OF FORCE GRADIENT CAUSED SOME DIFFICULTY	3	2	3	4	5	6	7	3.1	2.05
60	ANY SENSITIVE, BUT LACK OF FORCE GRADIENT CAUSED SOME DIFFICULTY	3	2	3	4	5	6	7	3.1	2.05
61	ANY SENSITIVE, BUT LACK OF FORCE GRADIENT CAUSED SOME DIFFICULTY	3	2	3	4	5	6	7	3.1	2.05
62	ANY SENSITIVE, BUT LACK OF FORCE GRADIENT CAUSED SOME DIFFICULTY	3	2	3	4	5	6	7	3.1	2.05
63	ANY SENSITIVE, BUT LACK OF FORCE GRADIENT CAUSED SOME DIFFICULTY	3	2	3	4	5	6	7	3.1	2.05
64	ANY SENSITIVE, BUT LACK OF FORCE GRADIENT CAUSED SOME DIFFICULTY	3	2	3	4	5	6	7	3.1	2.05
65	ANY SENSITIVE, BUT LACK OF FORCE GRADIENT CAUSED SOME DIFFICULTY	3	2	3	4	5	6	7	3.1	2.05
66	ANY SENSITIVE, BUT LACK OF FORCE GRADIENT CAUSED SOME DIFFICULTY	3	2	3	4	5	6	7	3.1	2.05
67	ANY SENSITIVE, BUT LACK OF FORCE GRADIENT CAUSED SOME DIFFICULTY	3	2	3	4	5	6	7	3.1	2.05
68	ANY SENSITIVE, BUT LACK OF FORCE GRADIENT CAUSED SOME DIFFICULTY	3	2	3	4	5	6	7	3.1	2.05
69	ANY SENSITIVE, BUT LACK OF FORCE GRADIENT CAUSED SOME DIFFICULTY	3	2	3	4	5	6	7	3.1	2.05
70	ANY SENSITIVE, BUT LACK OF FORCE GRADIENT CAUSED SOME DIFFICULTY	3	2	3	4	5	6	7	3.1	2.05
71	ANY SENSITIVE, BUT LACK OF FORCE GRADIENT CAUSED SOME DIFFICULTY	3	2	3	4	5	6	7	3.1	2.05
72	ANY SENSITIVE, BUT LACK OF FORCE GRADIENT CAUSED SOME DIFFICULTY	3	2	3	4	5	6	7	3.1	2.05
73	ANY SENSITIVE, BUT LACK OF FORCE GRADIENT CAUSED SOME DIFFICULTY	3	2	3	4	5	6	7	3.1	2.05
74	ANY SENSITIVE, BUT LACK OF FORCE GRADIENT CAUSED SOME DIFFICULTY	3	2	3	4	5	6	7	3.1	2.05
75	ANY SENSITIVE, BUT LACK OF FORCE GRADIENT CAUSED SOME DIFFICULTY	3	2	3	4	5	6	7	3.1	2.05
76	ANY SENSITIVE, BUT LACK OF FORCE GRADIENT CAUSED SOME DIFFICULTY	3	2	3	4	5	6	7	3.1	2.05
77	ANY SENSITIVE, BUT LACK OF FORCE GRADIENT CAUSED SOME DIFFICULTY	3	2	3	4	5	6	7	3.1	2.05
78	ANY SENSITIVE, BUT LACK OF FORCE GRADIENT CAUSED SOME DIFFICULTY	3	2	3	4	5	6	7	3.1	2.05
79	ANY SENSITIVE, BUT LACK OF FORCE GRADIENT CAUSED SOME DIFFICULTY	3	2	3	4	5	6	7	3.1	2.05
80	ANY SENSITIVE, BUT LACK OF FORCE GRADIENT CAUSED SOME DIFFICULTY	3	2	3	4	5	6	7	3.1	2.05
81	ANY SENSITIVE, BUT LACK OF FORCE GRADIENT CAUSED SOME DIFFICULTY	3	2	3	4	5	6	7	3.1	2.05
82	ANY SENSITIVE, BUT LACK OF FORCE GRADIENT CAUSED SOME DIFFICULTY	3	2	3	4	5	6	7	3.1	2.05
83	ANY SENSITIVE, BUT LACK OF FORCE GRADIENT CAUSED SOME DIFFICULTY	3	2	3	4	5	6	7	3.1	2.05
84	ANY SENSITIVE, BUT LACK OF FORCE GRADIENT CAUSED SOME DIFFICULTY	3	2	3	4	5	6	7	3.1	2.05
85	ANY SENSITIVE, BUT LACK OF FORCE GRADIENT CAUSED SOME DIFFICULTY	3	2	3	4	5	6	7	3.1	2.05
86	ANY SENSITIVE, BUT LACK OF FORCE GRADIENT CAUSED SOME DIFFICULTY	3	2	3	4	5	6	7	3.1	2.05
87	ANY SENSITIVE, BUT LACK OF FORCE GRADIENT CAUSED SOME DIFFICULTY	3	2	3	4	5	6	7	3.1	2.05
88	ANY SENSITIVE, BUT LACK OF FORCE GRADIENT CAUSED SOME DIFFICULTY	3	2	3	4	5	6	7	3.1	2.05
89	ANY SENSITIVE, BUT LACK OF FORCE GRADIENT CAUSED SOME DIFFICULTY	3	2	3	4	5	6	7	3.1	2.05
90	ANY SENSITIVE, BUT LACK OF FORCE GRADIENT CAUSED SOME DIFFICULTY	3	2	3	4	5	6	7	3.1	2.05
91	ANY SENSITIVE, BUT LACK OF FORCE GRADIENT CAUSED SOME DIFFICULTY	3	2	3	4	5	6	7	3.1	2.05
92	ANY SENSITIVE, BUT LACK OF FORCE GRADIENT CAUSED SOME DIFFICULTY	3	2	3	4	5	6	7	3.1	2.05
93	ANY SENSITIVE, BUT LACK OF FORCE GRADIENT CAUSED SOME DIFFICULTY	3	2	3	4	5	6	7	3.1	2.05
94	ANY SENSITIVE, BUT LACK OF FORCE GRADIENT CAUSED SOME DIFFICULTY	3	2	3	4	5	6	7	3.1	2.05
95	ANY SENSITIVE, BUT LACK OF FORCE GRADIENT CAUSED SOME DIFFICULTY	3	2	3	4	5	6	7	3.1	2.05
96	ANY SENSITIVE, BUT LACK OF FORCE GRADIENT CAUSED SOME DIFFICULTY	3	2	3	4	5	6	7	3.1	2.05
97	ANY SENSITIVE, BUT LACK OF FORCE GRADIENT CAUSED SOME DIFFICULTY	3	2	3	4	5	6	7	3.1	2.05
98	ANY SENSITIVE, BUT LACK OF FORCE GRADIENT CAUSED SOME DIFFICULTY	3	2	3	4	5	6	7	3.1	2.05
99	ANY SENSITIVE, BUT LACK OF FORCE GRADIENT CAUSED SOME DIFFICULTY	3	2	3	4	5	6	7	3.1	2.05
100	ANY SENSITIVE, BUT LACK OF FORCE GRADIENT CAUSED SOME DIFFICULTY	3	2	3	4	5	6	7	3.1	2.05

***** ZEROS INDICATE NO RATING BY PILOT *****

SAILPLANE 4 DATA

TASK	DESCRIPTION OF TASKS	1	2	PILOT 3	4	5	6	7	AVER.	STD DEV					
21	C. PILOT OPIN. OF LONG. HANDLING	.00	2.00	4.00	.00	3.00	4.00	3.00	3.200	.748					
22	BASE OF TRIM & MAN. CONTROL SPEED	.00	2.00	2.00	3.00	3.00	3.00	3.00	3.000	.431					
23	TRIM SENSITIVITY	.00	2.00	2.00	3.00	3.00	3.00	3.00	3.000	.927					
24	PITCH SENSITIVITY	.00	2.00	2.00	3.00	3.00	3.00	3.00	3.000	.867					
25	STICK FORCE GRADIENT	.00	2.00	2.00	3.00	3.00	3.00	3.00	3.000	1.007					
26	STICK FIXED STABILITY	.00	2.00	2.00	3.00	3.00	3.00	3.00	3.000	.007					
27	STICK FREE STABILITY	.00	2.00	2.00	3.00	3.00	3.00	3.00	3.000	.007					
28	RETURN TO TRIM	.00	2.00	2.00	3.00	3.00	3.00	3.00	3.000	.007					
29	MANEUVERING CHARACTERISTICS	.00	2.00	2.00	3.00	3.00	3.00	3.00	3.000	.007					
30	PHUGOID CHARACTERISTICS	.00	2.00	2.00	3.00	3.00	3.00	3.00	3.000	.007					
31	DIVE RECOVERY	.00	.00	2.00	1.00	2.00	2.00	2.00	2.200	.980					
78	AVER. AND STD. DEV. OF SUBTASKS(EX 1,2,..)	.0	.0	2.1	.3	2.6	.8	1.6	.6	2.2	.6	2.2	.6	2.3	.87
TASK	PILOT	COMMENTS													
22	3	OCCASIONAL OVERSHOOT IS EXPERIENCED WHEN CHANGES ARE ATTEMPTED													
23	4	IAS EASY TO OBTAIN, HOWEVER, IT IS DIFFICULT TO ACTUATE TRIM LEVER													
24	4	FOR MAINTAINING IAS													
25	4	HARD TO ADJUST PRECISELY													
26	4	ABLE TO TRIM THROUGHOUT REQD TRIM RANGE													
27	4	VERY GOOD													
28	4	VERY SENSITIVE													
29	4	FOUND CENTERING SPRING ANNOYING													
30	4	FORCE GRADIENT IS THE RESULT OF WORKING AGAINST SPRINGS. THIS													
31	4	RESULTS IN FORCES AS HIGH AS 18-22N DURING ALL MANEUVERS EXCEPT													
32	4	T.O., LANDING, AND STICK FORCE/LGL. VERY LIGHT FORCES WOULD BE													
33	4	MORE DESIRABLE.													
34	4	LIGHT BUT OK													
35	3	NONLINEARITY OBSERVED GOING BACK FROM 57 TO 52 OK. STARTING FROM													
36	3	48 OSCILLATION BEGAN. SAME AS STICK FIXED													
37	3	POSITIVE STICK FORCE/V GRADIENT													
38	3	DID NOT DO													
39	3	GOOD													
40	3	VERY PLEASANT IF SAME TRIM SPEED IS DESIRED AT END OF MANEUVER													
41	3	POSITIVE FORCE GRADIENT WITH LGL.													
42	4	OK													
43	4	NEUTRAL--APPROX. 16SEC PERIOD													
44	4	NEARS NEUTRAL--APPROX. 16SEC PERIOD													
45	4	VIRTM 48IAS 20 SEC PERIOD MODERATELY DAMPED													
46	4	LIGHT BUT NO SURPRISES													
47	4	GOOD NO PROBLEM													
48	4	POSITIVE FORCE GRADIENT WITH LGL													
49	4	GIVES IMPRESSION OF LIGHT STABILITY WITH STIFF, INSENSITIVE STICK.													
50	4	QUICK, LIGHT BUT CONSISTENT. PLEASANT TO FLY													
51	4	WHEN RETURNING FROM OFF TRIM. CONDITION, PHUGOID OSCILLATION WAS													
52	4	EXCITED IN 2 OF 3 CASES.													
53	4	STICK FORCE PER LGL TOO LIGHT. STICK FORCE PER DISPLACEMENT MAY BE													
54	4	OK. STICK FORCE GRADIENT IN BOTH LGL AND MANEUVERING FLIGHT.													
55	4	HIGH STICK FORCE GRADIENT IN BOTH LGL AND MANEUVERING FLIGHT.													
56	4	IN FREE FLIGHT, MUCH OF THE REQUIRED PITCH CENTERING SPRING DETENT.													
57	4	OF SMALL DEFLECTIONS AROUND THE STRONG CENTERING SPRING DETENT.													
58	4	THE PILOT IS DEPRIVED OF TRUE ANTICIPATORY FEEL FOR AIRPLANE RESPONSE													
59	4	TO THESE PREVIOUSLY BLUNTERED APIN RESEARCH FORCES. THIS IS A													
60	4	GOOD QUALITY BUT ALLEGEDLY IN RESEARCH FORCES. IT DOES NOT													
61	4	SEVERELY AFFECT ALLEGEDLY IN RESEARCH FORCES. IT DOES NOT													
62	4	PITCH INPUTS AND IS IRRITATING.													

***** ZEROS INDICATE NO RATING BY PILOT *****

SAILPLANE 5 DATA

TASK	DESCRIPTION OF TASKS	1	2	PILOT	4	5	6	7	AVER.	STD DEV
C.	PILOT OPIN OF LONG. HANDLING	5.00	00	00	00	00	4.00	4.00	4.200	1.327
1.	EASE OF EST & MAIN CON AIRSPEED	2.00	60	20	00	00	4.00	4.00	4.400	.800
2.	TRIM SYS OVER SPEED RANGE	2.00	20	20	00	00	4.00	4.00	4.200	.800
3.	PLATEAU SENSITIVITY	4.00	00	20	00	00	4.00	4.00	4.200	1.166
4.	PITCH FORCE GRADIENT	1.00	00	20	00	00	4.00	4.00	4.200	1.166
5.	STICK FORCE STABILITY	2.00	00	20	00	00	4.00	4.00	4.200	.800
6.	STICK FRICTION STABILITY	10.00	00	20	00	00	4.00	4.00	4.200	.800
7.	RECOVERY FROM STALL	10.00	00	20	00	00	4.00	4.00	4.200	.800
8.	MANEUVERING RESPONSE	10.00	00	20	00	00	4.00	4.00	4.200	.800
9.	PHUGOID CHARACTERISTICS	10.00	00	20	00	00	4.00	4.00	4.200	.800
10.	DIVE RECOVERY	12.00	60	20	00	00	4.00	4.00	4.200	1.378
78	AVER. AND STD. DEV. OF SUBTASKS(EX 1,2,...)	4.5	3.7	3.4	2.0	2.4	.5	.0	.0	.0
							.0	.0	3.7	1.3
							.0	.0	3.4	2.14

COMMENTS

[illegible]

***** ZEROS INDICATE NO RATING BY PILOT *****

SAILPLANE 6 DATA

TASK	DESCRIPTION OF TASKS	1	2	PILOT 3	4	5	6	7	AVER.	STD DEV
21	C. PILOT OPIN OF LONG. HANDLING	.00	.00	2.00	.00	.00	4.00	2.00	2.667	.943
22	1. LOSS OF STICK CONTROL	.00	.00	2.00	.00	.00	3.00	2.00	2.000	.577
23	2. LOSS OF STICK CONTROL	.00	1.00	3.00	.00	.00	3.00	2.00	2.667	1.020
24	3. LOSS OF STICK CONTROL	.00	1.00	1.00	.00	.00	2.00	1.00	1.667	1.471
25	4. LOSS OF STICK CONTROL	.00	1.00	4.00	.00	.00	4.00	2.00	2.333	1.247
26	5. LOSS OF STICK CONTROL	.00	1.00	2.00	.00	.00	2.00	2.00	2.000	1.400
27	6. LOSS OF STICK CONTROL	.00	2.00	2.00	.00	.00	3.00	2.00	2.000	.748
28	7. LOSS OF STICK CONTROL	.00	2.00	2.00	.00	.00	2.00	2.00	2.000	.577
29	8. LOSS OF STICK CONTROL	.00	2.00	2.00	.00	.00	2.00	2.00	2.000	.000
30	9. LOSS OF STICK CONTROL	.00	2.00	2.00	.00	.00	2.00	2.00	2.000	.000
31	10. LOSS OF STICK CONTROL	.00	2.00	2.00	.00	.00	2.00	2.00	2.000	.000
70	AVER. AND STD. DEV. OF SUBTASKS (EX 1,2,..)	.0	.0	1.4	.5	2.4	.8	2.0	.5	2.7
									.8	1.7
									.5	2.1
										.73

TASK	PILOT	COMMENTS
21	1	VERY EASY WITHIN TRIM RANGE.
22	1	POWERFUL AND POSITIVE
23	1	MAX OUT OF TRIM AROUND 74IAS
24	1	NO TRIM BEYOND 70
25	1	GOOD, BUT GOOD FOR TRAINER
26	1	EXCESSIVE
27	1	FOR AIRSPEED TOO POWERFUL
28	1	HIGH, BUT GOOD FOR TRAINER
29	1	QUITE STABLE
30	1	APPEARS TO BE POSITIVE
31	1	POSITIVE
32	1	EXCESSIVE, HEAVY FORCES ARE REQUIRED TO CHANGE AIRSPEED
33	1	POSITIVE
34	1	QUALITATIVELY GOOD
35	1	GOOD FREE RETURN
36	1	+2-3 KTS
37	1	TOO STRONG A TENDENCY
38	1	VTRIM 52IAS LOW 50 HIGH 54, VTRIM 65IAS LOW 58 HIGH 79
39	1	GOOD POSITIVE
40	1	SOMEWHAT SLOW
41	1	POSITIVE STICK FORCE/161
42	1	LIGHTLY DAMPED
43	1	UNSTABLE PHUGOID AT 60KTS
44	1	NEUTRAL
45	1	VTRIM 52IAS 22SEC PERIOD, VTRIM 65IAS 26 SEC PERIOD
46	1	GOOD ON A LIGHT FOR TRAINER
47	1	GOOD ON A HEAVY FOR TRAINER
48	1	STICK GRADIENTS ARE LITTLE TOO HEAVY. SOME BUFFETING WELL INTO
49	1	STICKING UP AND DOWN. SOME GRADIENTS ARE LITTLE TOO HEAVY. SOME BUFFETING WELL INTO
50	1	EXCELLENT CONTROL CHARACTERISTICS FOR TRAINING MISSION

***** ZEROS INDICATE NO RATING BY PILOT *****

SAILPLANE 1 DATA

TASK	DESCRIPTION OF TASKS										PILOT 3		4	5	6	7	AVER.	STD DEV
D. PILOT OPINION OF LATERAL HANDLING																		
1. AILERON FORCE GRADIENT	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.000	.000	
2. RUDDER FORCE GRADIENT	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.429	.495	
3. ROLL RATE OVER SPEED RANGE	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.429	.495	
4. SIDESLIP CHARACTERISTICS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.000	.726	
5. EASE OF TURN ENTRY	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.000	.726	
6. EASE OF TURN EXIT	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.000	.457	
7. YAW DUE TO ROLL	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.000	.577	
8. EASE OF MAIN. 0.785RAD BANK TURN	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.429	.728	
9. EASE OF MAIN. 1.047RAD BANK TURN	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.429	.728	
AVER. AND STD. DEV. OF SUBTASKS(EX 1,2,3,4,5,6,7,8,9)	1.3	.5	1.2	.6	1.4	.5	1.7	.7	2.2	.4	1.9	.8	2.0	.8	1.7	.72		

COMMENTS

TASK	PILOT	COMMENTS
32	3	VERY PLEASANT
33	3	CONTROL HARMONY VERY GOOD
34	3	OCCASIONALLY TOO LIGHT
35	3	EXCELLENT
36	3	ABOUT .209 TO .262 RAD./SEC AT SPEEDS CHECKED
37	3	.38RAD/SEC AT 39 IAS, .463RAD/SEC AT 57IAS
38	3	RUDDER FORCE REVERSED BUT GOOD OTHERWISE
39	3	APPROX .262RAD BANK REQD FOR MAX RUDDER DEFLECTION FOR CONSTANT HEADWIND
40	3	POSITIVE STABILITY HOWEVER A/S BLANKS OUT WITH YAW
41	3	RUDDER LOCKS
79	3	STEADY HEADING SIDESLIP--RUDDER FORCE GRADIENT LIGHTENS AFTER ABOUT 1/2 TURN, BUT NO REVERSAL. FULL RUDDER REQUIRES .262RAD BANK--SLIGHT PITCH UP--LIGHTLY POSITIVE DIHEDRAL EFFECT
33	3	VERY EASY
34	3	VERY EASY RUDDER REQUIRED FOR INITIAL ROLL, SLIGHTLY MORE FOR LATER
35	3	VERY NOTICEABLE, BUT STILL IT IS POSSIBLE TO MAKE A GOOD TURN WITH
36	3	AILERONS ONLY
37	3	VERY EASY TO MAINTAIN COORDINATED CONTROL
38	3	ABOUT .262RAD RUDDER FIXED
39	3	CAN PICK UP LOW WING WITH RUDDER--.262RAD ROLL IN 5 SEC WITH FULL
40	3	RUDDER AT 39IAS
41	3	ONE OF THE BEST
79	3	GOOD--SLIGHT AMOUNT OF TOP STICK REQUIRED
33	3	EXCELLENT
34	3	SAME AS D.8
35	3	VERY LIGHT AND RESPONSIVE
36	3	SUPERB COORDINATION IN MANEUVERING FLIGHT
37	3	EXCELLENT FOR THERMALING
38	3	SPRINT STABILITY NEUTRAL--VERY GOOD--PITCH ROLL CONTROL AND RESPONSE
39	3	HARMONY IS VERY GOOD

***** ZEROS INDICATE NO RATING BY PILOT *****

SAILPLANE 2 DATA

TASK	DESCRIPTION OF TASKS	1	2	PILOT 3	4	5	6	7	AVER.	STD DEV							
32	D. PILOT OPINION OF LATERAL HANDLING	2.00	2.00	3.00	.00	.00	3.00	4.00	2.800	.748							
33	1. AILERON FORCE GRADIENT	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.143	.639							
34	2. AILERON FORCE GRADIENT RANGE	3.00	2.00	1.00	1.00	1.00	1.00	1.00	1.143	.639							
35	3. AILERON FORCE GRADIENT	3.00	2.00	1.00	1.00	1.00	1.00	1.00	1.143	.639							
36	4. AILERON FORCE GRADIENT	3.00	2.00	1.00	1.00	1.00	1.00	1.00	1.143	.639							
37	5. AILERON FORCE GRADIENT	3.00	2.00	1.00	1.00	1.00	1.00	1.00	1.143	.639							
38	6. AILERON FORCE GRADIENT	3.00	2.00	1.00	1.00	1.00	1.00	1.00	1.143	.639							
39	7. AILERON FORCE GRADIENT	3.00	2.00	1.00	1.00	1.00	1.00	1.00	1.143	.639							
40	8. AILERON FORCE GRADIENT	3.00	2.00	1.00	1.00	1.00	1.00	1.00	1.143	.639							
41	9. EASE OF MAIN. 1.047RAD BANK TURN	1.00	2.00	2.00	2.00	2.00	1.00	2.00	2.143	.639							
79	AVER. AND STD. DEV. OF SUBTASKS(EX 1,2,...)	1.9	.7	2.1	.3	2.1	.6	2.5	.9	2.8	.6	2.1	.8	3.0	.8	2.4	.80

TASK	COMMENTS
32	EXCESSIVE FRICTION NOT GOOD--FOR LONG PERIODS OF TURNING FLT. IT BECAME OBVIOUS THAT AILERON FORCES ARE TOO HEAVY.
33	JUST ABOUT RIGHT FOR PURE ROLL
34	VERY PLEASANT
35	RUDDER NOT EFFECTIVE ENOUGH AT LOW SPEEDS WHEN EXECUTING RAPIDLY APPROX 3.5 SEC AT THERMALLING SPEEDS
36	ABOUT 349RAD/SEC AVERAGE
37	ABOUT 78IAS .489RAD/SEC, VTRIM 52IAS .384RAD/SEC
38	NOT CHECKED
39	AIR SPEED GOES WILD--NO PROBLEM. RUDDER FORCE REVERSES VERY LITTLE BANK REQUIRED FOR MAXIMUM RUDDER DEFLECTION FOR CONSTANT HEADING FLT.
40	RUDDER OVERBALANCES BUT NO PROBLEM.
41	VTRIM 48 DELAPES, SPIRAL STABILITY SLIGHTLY NEGATIVE. MODERATE PITCHUP--UNUSUAL. RUDDER OVER BALANCE ABOUT 1/2 DEFLECTION
42	RUDDER INSUFFICIENT BUT EVEN SO, THE TURN ENTRY WAS GOOD
43	NOT TOO EASY
44	HAVE TO WORK AT RUDDER TO COORDINATE
45	VERY DIFFICULT TO KEEP YAW STRING CENTERED
46	RUDDER KEEP WORKING TO CENTER OF YAW STRING
47	CAN BE DOWN HANDS OFF
48	FAIRLY DIFFICULT AT LOWER SPEEDS
49	NO FLEWATOR FORCE
50	WORKS TO COORDINATE
51	WALKS TO COORDINATE
52	FAIRLY DIFFICULT AT LOWER SPEEDS
53	NO FLEWATOR FORCE
54	NO FLEWATOR FORCE
55	NO FLEWATOR FORCE
56	NO FLEWATOR FORCE
57	NO FLEWATOR FORCE
58	NO FLEWATOR FORCE
59	NO FLEWATOR FORCE
60	NO FLEWATOR FORCE
61	NO FLEWATOR FORCE
62	NO FLEWATOR FORCE
63	NO FLEWATOR FORCE
64	NO FLEWATOR FORCE
65	NO FLEWATOR FORCE
66	NO FLEWATOR FORCE
67	NO FLEWATOR FORCE
68	NO FLEWATOR FORCE
69	NO FLEWATOR FORCE
70	NO FLEWATOR FORCE
71	NO FLEWATOR FORCE
72	NO FLEWATOR FORCE
73	NO FLEWATOR FORCE
74	NO FLEWATOR FORCE
75	NO FLEWATOR FORCE
76	NO FLEWATOR FORCE
77	NO FLEWATOR FORCE
78	NO FLEWATOR FORCE
79	NO FLEWATOR FORCE

***** ZEROS INDICATE NO RATING BY PILOT *****

SAILPLANE 3 DATA

TASK	DESCRIPTION OF TASKS	1	2	3	4	5	6	7	AVER.	STD DEV
33	D. PILOT OPTION OF LATERAL HANDLING	1.50	2.00	2.50	3.00	3.00	3.00	3.00	2.209	.519
34	1. AILERON FORCE GRADIENT	1.00	2.00	3.00	1.00	2.00	2.00	3.00	1.857	.639
35	2. RUDDER FORCE GRADIENT	1.00	2.00	2.00	1.00	2.00	2.00	3.00	1.857	.639
36	3. ROLLERAP OVER RANGE	2.00	2.00	2.00	3.00	3.00	3.00	3.00	2.857	.639
37	4. SIDE SLIP CHARACTERISTICS	1.00	2.00	2.00	1.00	2.00	2.00	3.00	1.857	.639
38	5. EASE OF TURN ENTRY	2.00	2.00	2.00	3.00	3.00	3.00	3.00	2.167	.748
39	6. EASE DUE TO ROLL	1.00	1.00	2.00	2.00	3.00	3.00	3.00	2.200	.693
40	7. YAW DUE TO ROLL	1.00	2.00	2.00	1.00	2.00	2.00	3.00	1.643	.776
41	8. EASE OF MAIN. 0.785RAD BANK TURN	2.00	2.00	1.50	1.00	3.00	1.00	3.00	1.929	.81
42	9. EASE OF MAIN. 1.047RAD BANK TURN	1.3	.5	2.1	.6	2.0	.4	1.4	.7	2.8
79	AVER. AND STD. DEV. OF SUBTASKS (EX 1,2,..)	1.3	.5	2.1	.6	2.0	.4	1.4	.7	2.8
43	COMMENTS									
44	FLEXIBLE WING ON SAILPLANE 5 MAKES IT WORSE									
45	LIGHT, MAYBE TOO MUCH SO.									
46	AILERON-ELEVATOR FORCE HARMONY-EXCELLENT									
47	TOOK ATTENTION EFFORT TO COORDINATE									
48	OVERBALANCES AT 3/4 DEFLECTION									
49	NO VARIATION OBSERVED. ADEQUATE THROUGHOUT.									
50	ABOUT 34.6RAD/SEC AT SPEEDS CHECKED									
51	ABOUT 48KTS. 38.4RAD/SEC, 80KTS. 52.4RAD/SEC									
52	RUDDER WEAK. PITCHES NOSE DOWN MODERATELY									
53	PLEASANT, ALTHOUGH FORCE REVERSAL OCCURS.									
54	WHEN WINGS ARE LEVELLED.									
55	POSTITIVE AT 60 TAS, FULL RUDDER DEFLECTION WILL RESULT IN RUDDER									
56	LOCK, ALSO A LOSS OF AIRSPEED.									
57	RUDDER FORCE LIGHTENED BUT NEVER ZERO OR REVERSED.									
58	BUFFET OVERBALANCE IN RUDDER IN BOTH DIRECTIONS. PITCH DOWN WITH SLIP									
59	LESS RUDDER REQUIRED THAN SAILPLANE 2									
60	AVERAGE ADVERSE YAW									
61	SEEMS ATTENTION TO RUDDER									
62	TAKEN PRONOUNCED. HAVE TO MODULATE RUDDER TO COORDINATE.									
63	NO PROBLEM									
64	NO PROBLEM									
65	NO PROBLEM									
66	NO PROBLEM									
67	NO PROBLEM									
68	NO PROBLEM									
69	NO PROBLEM									
70	NO PROBLEM									
71	NO PROBLEM									
72	NO PROBLEM									
73	NO PROBLEM									
74	NO PROBLEM									
75	NO PROBLEM									
76	NO PROBLEM									
77	NO PROBLEM									
78	NO PROBLEM									
79	NO PROBLEM									

ROLL COORDINATION NO PROBLEM-AILERONS SHORT OF SAIL PLANE 1 OR 5. SPIN

***** ZEROS INDICATE NO RATING BY PILOT *****

SAILPLANE 5 DATA

[illegible]

***** ZEROS INDICATE NO RATING BY PILOT *****

SAILPLANE 6 DATA

TASK	DESCRIPTION OF TASKS	1	2	PILOT 3	4	5	6	7	AVER.	STD DEV
32	D. PILOT OPINION OF LATERAL HANDLING	.00	.00	2.00	.00	.00	2.00	2.00	2.000	.000
33	1. RUDDER FORCE GRADIENT	.00	.00	2.00	.00	2.00	2.00	2.00	2.000	.000
34	2. ROLL RATE OVER SPEED RANGE	.00	.00	2.00	2.00	2.00	2.00	2.00	2.000	.000
35	3. ROLL RATE CHARACTERISTICS	.00	.00	2.00	2.00	2.00	2.00	2.00	2.000	.000
36	4. SIDESLIP CHARACTERISTICS	.00	.00	2.00	2.00	2.00	2.00	2.00	2.000	.000
37	5. EASE OF TURN ENTRY	.00	.00	2.00	2.00	2.00	2.00	2.00	2.000	.000
38	6. YAW DUE TO ROLL	.00	.00	2.00	2.00	2.00	2.00	2.00	2.000	.000
39	7. YAW DUE TO TURN	.00	.00	2.00	2.00	2.00	2.00	2.00	2.000	.000
40	8. EASE OF MAIN. 0.785RAD BANK TURN	.00	.00	2.00	2.00	2.00	2.00	2.00	2.000	.000
41	9. EASE OF MAIN. 1.047RAD BANK TURN	.00	.00	2.00	2.00	2.00	2.00	2.00	2.000	.000
79	AVER. AND STD. DEV. OF SUBTASKS (EX 1,2,3,4)	.0	.0	2.4	.5	1.9	.6	2.4	.5	2.6
					.4	3.2	1.2	2.1	.6	2.4
										.81

COMMENTS

TASK	COMMENTS	PILOT
33	FEELS BETTER THAN PITCH STICK GRADIENT	3
34	GOOD	3
35	TOO HEAVY	3
36	GOOD RUDDER FORCE TO COORDINATE	3
37	VTRIM 52IAS .314RAD/SEC, VTRIM 78IAS .454RAD/SEC	3
38	SLIGHT PITCH/ROLL COUPLING-ALSO RUDDER A LITTLE WEAK	3
39	LOWER SINK RATE THAN OTHERS	2
40	10DEG BANK WITH FULL RUDDER APPROX. .17RAD YAW	2
41	LOCK. LOSE AIRSPEED AFTER APPROX. .17RAD YAW	4
42	SLIGHT PITCH DOWN WITH SIDESLIP. .17RAD BANK FOR FULL RUDDER, SLIGHT	4
43	AT LITTLE SLOW NEAR STALL.	7
44	NEUTRAL EFFECT AT 52IAS, NEUTRAL AT 78IAS	7
45	VERY GOOD	2
46	ABOUT AVERAGE	2
47	VERY GOOD	2
48	BECAUSE OF HEAVY RUDDER FORCES, APPROX 89N IN MAINTAINING TURN	2
49	NEUTRAL LOW AMPLITUDE, LONG PERIOD	4
50	STICK FORCE/LGL APPROX 9N	5
51	VERY GOOD	7
52	BUFFETING	3
53	SAME AS .785RAD BANK	4
54	STICK FORCE/LGL APPROX 22N	7
55	EXCELLENT EXCEPT NEAR STALL	7
56	EXCELLENT LATERAL-DIRECTIONAL CHARACTERISTICS MIXED SOMEWHAT BY	7
57	BUFFETING 9000 ROLL RESPONSE. NO UNHARMONIOUS FORCE ONLY ABOUT 89N	7
58	HARD TO COORDINATE USE OF STICK, BUT STICK FORCE/LGL	7
59	BUT SEEMS HIGH RELATIVE TO STICK, TO CONTROL, BUT STICK FORCE/LGL	7
60	45 AND 60DEG- BANK LESS THAN EASY, TO CONTROL, BUT STICK FORCE/LGL	5
61	VERY LIGHT RESULTING IN OVERCONTROLLING ELEVATOR AND GETTING STALL	5
62	BUFFETING FREQUENT COORDINATION READ WOULD NOT BE ACCEPTABLE IN A	5
63	VERY GOOD- RUDDER COORDINATION READ WOULD NOT BE ACCEPTABLE IN A	5
64	POWERED AIRPLANE, BUT AS SAILPLANES 60.....	5

SAILPLANE 1 DATA

TASK	DESCRIPTION OF TASKS	1	2	PILOT 3	4	5	6	7	AVER.	STD DEV							
42	E. PILOT OPTN OF PLANE STALLSPIN CHAR	1.50	3.00	1.00	.00	.00	2.00	.00	1.875	.740							
43	1. RUDDER,AILERON EFFECT DUR. STALL	2.00	3.00	2.00	1.00	.00	3.00	.00	2.000	.532							
44	2. STALL WARNING	1.00	4.00	2.00	3.00	.00	3.00	.00	2.429	.495							
45	3. AGGRAVATED STALL-TEND TO SPIN	1.00	2.00	2.00	2.00	.00	2.00	.00	2.000	1.000							
46	4. STICK FORCE- GRADIENT	1.00	1.00	1.00	1.00	.00	2.00	.00	1.571	.728							
47	5. STALL RECOVERY, ALTITUDE LOSS	.00	1.00	1.00	1.00	.00	2.00	.00	1.333	.471							
48	6. SPIN ENTRY	1.00	3.00	1.00	.00	.00	2.00	.00	1.750	.829							
49	7. SPIN RECOVERY	1.00	2.00	1.00	1.00	.00	2.00	.00	1.000	.000							
50	8. STALL FROM TURN AT LOW SPEED	1.00	2.00	1.00	1.00	.00	2.00	.00	1.500	.500							
80	AVER. AND STD. DEV. OF SUBTASKS(EX 1,2,...)	1.3	.5	2.1	1.1	1.4	.5	1.5	.2	2.0	.0	2.3	.5	1.8	.7	1.8	.76
TASK	PILOT	COMMENTS															
43	2	RUDDER EFFECTIVE,AILERONS INEFFECTIVE. RUDDER WILL NOT PICK UP															
44	2	BUT WILL ARREST FURTHER DROP															
45	2	ADEQUATE															
46	2	BUFFET OCCURRED APPROX 1/2 KT ABOVE STALL															
47	2	THERE IS A DEFINITE TENDENCY TO FALL OFF TO ONE SIDE															
48	2	VERY SLOW WING DROP OFF, BUT EASILY RECOVERABLE BY RELEASING STICK															
49	2	EXCELLENT															
50	2	12% VERY LITTLE PRESSURE LESS THAN 15W.															
43	3	MODERATE ENTRY RATE															
44	3	SLOW BUT PLenty OF TIME TO CATCH IT															
45	3	IMMEDIATE RECOVERY															
46	3	SLIGHTLY NEUTRAL ELEVATOR, SLIGHTLY OPPOSITE RUDDER															
47	3	NO AGGRAVATED STALL-SPIN ENTRY															
48	3	DIFFICULT TO DO															
49	3	STALL-SPIN CHARACTERISTICS ARE GOOD TO EXCELLENT. LACK OF SLIPPERI- NESS (ASSOCIATED WITH GLASS SHIPS) IS PROBABLY RESPONSIBLE FOR GOOD															
50	3	STALL CHARACTERISTICS															
43	4	ALL THE ABOVE SAFE															
44	4	LOW ALTITUDE															
45	4	LIGHT BUFFET AT 35IAS															
46	4	CONROLS, AIRPLANE STARTS FLYING AGAIN. EXCELLENT CHARACTERISTICS-VERY SAFE															
47	4	AND AIRPLANE															
48	4	TURNING STALL, CROSSED															
49	4	BY ITSELF; NOSE FALLS THRU															
50	4	EXCELLENT CHARACTERISTICS-VERY SAFE															

***** ZEROS INDICATE NO RATING BY PILOT *****

SAILPLANE 2 DATA

TASK	DESCRIPTION OF TASKS	1	2	PILOT 3	4	5	6	7	AVER.	STD DEV							
E.	PILOT OPIN OF PLANE STALLSPIN CHAR	1.00	1.00	3.00	.00	.00	.00	1.00	2.200	1.600							
42	1. RUDDER/AILERON EFFECT DUR. STALL	1.00	1.00	3.00	1.00	.00	.00	1.00	1.857	1.325							
43	2. STALL WARNING	1.00	1.00	3.00	1.00	.00	5.00	4.00	2.214	1.385							
44	3. AGGRAVATED STALL-TEND TO SPIN	1.00	1.00	3.00	1.00	.00	5.00	1.00	2.143	1.325							
45	4. STALL FORCE GRADIENT	1.00	1.00	3.00	2.00	3.00	3.00	2.00	2.000	1.256							
46	5. STALL RECOVERY, ALTITUDE LOSS	1.00	.00	2.00	1.00	2.00	3.00	1.00	1.667	.745							
47	6. SPIN ENTRY	1.00	.00	2.00	1.00	.00	5.00	2.00	1.500	1.414							
48	7. SPIN RECOVERY	1.00	1.00	2.00	1.00	.00	.00	1.00	1.500	1.500							
49	8. STALL FROM TURN AT LOW SPEED	1.00	1.00	2.00	1.00	3.00	4.00	1.00	1.857	1.325							
80	AVER. AND STD. DEV. OF SUBTASKS(EX 1,2,..)	1.0	.0	1.0	.0	2.2	.4	1.5	.8	2.5	.5	4.3	1.0	1.6	1.0	2.1	1.27

COMMENTS

TASK	PILOT	COMMENTS
42	3	DURING STALLS RUDDER POOR, AILERON FAIRLY GOOD
43	3	ADEQUATE, SOME OF IT IS IN THE FORM OF CHANGING NOISE CHARACTER.
44	7	NO BUFFET WARNING-DIRECTIONAL STABILITY APPARENTLY DETERIATES!
45	7	WANDERS IN YAW
46	3	NONE FOUND
47	3	ABOUT AVERAGE
48	3	15M. PILOT SPIN FAIRLY MILD
49	3	FAST RECOVERY
50	3	JUST RELAX AFT STICK FORCE
80	3	NOT PROBLEM
80	3	PILOT OPIN STALL THERE IS A TENDENCY OF ROLL OSCILLATIONS.
80	3	EASY STALL RECOVERY FROM EITHER TURN DIRECTION.
80	3	STALL WARNING AND SUDDEN BREAK MAKE SHIP UNDESIRABLE
80	3	VERY SENSITIVE THERMAL SOARING FOR A LOW TIME PILOT
80	3	VERY EXCESSIVE STALLS TURNING AND 1 LGT STICK CAN RE HELD FULL AFT
80	3	AND PLANE CAN BE REVERSED IN BANK--CAN BE FLOWN INDEFINITELY
80	3	AND HELD

***** ZEROS INDICATE NO RATING BY PILOT *****

SAILPLANE 3 DATA

TASK	DESCRIPTION OF TASKS	1	2	PILOT	4	5	6	7	AVER.	STD DEV.							
E.	PILOT OPIN OF PLANE STALLSPIN CHAR																
423	1. RUDDER,AILERON EFFECT DUR. STALL	2.00	2.00	3.00	.00	.00	4.00	1.00	2.400	1.020							
443	2. STALL WARNING	1.00	2.00	2.00	.00	.00	3.00	1.00	1.857	.639							
445	3. AGGRAVATED STALL-TEND TO SPIN	1.00	2.00	3.00	.00	.00	4.00	1.00	2.571	.904							
446	4. STICK FORCE GRADIENT	3.00	2.00	3.00	.00	.00	4.00	1.00	2.571	.904							
447	5. STALL RECOVERY, ALTITUDE LOSS	2.00	2.00	3.00	.00	.00	4.00	1.00	2.571	.904							
448	6. SPIN ENTRY	.00	.00	3.00	.00	.00	3.00	1.00	2.571	.904							
449	7. SPIN RECOVERY	2.00	2.00	3.00	.00	.00	4.00	1.00	2.571	.904							
450	8. STALL FROM TURN AT LOW SPEED	2.00	1.00	2.00	.00	.00	2.00	1.00	2.000	1.000							
80	AVER. AND STD. DEV. OF SUBTASKS(EX 1,2,..)	1.8	.7	1.8	.4	2.6	.5	2.4	.5	2.2	.4	3.1	.6	1.5	1.0	2.2	.83
TASK	PILOT	COMMENTS															
3	3	3 KTS															
4	4	ADEQUATE															
4	4	VERY LIGHT AIRFRAME BUFFET APPROX. 2KTS ABOVE STALL.															
4	4	LIGHT BUFFETING CLOSE (3KTS) TO STALL															
4	5	NO WARNING IN THE GLIDER															
7	7	WITH FULLY DEVELOPED STALL, A/C ROLLS OFF ON LEFT WING AND NOSE															
7	7	PROPS APPROX 330 RAD BELOW HORIZON															
7	7	FALLS OFF ON WING AND ROTATES, EASY TO CONTROL															
7	7	COULD BE IMPROVED--NOT ENOUGH FORCE															
1	1	GOOD REALLY GOOD CUE FOR IMMINENT STALL															
2	2	NOT VERY															
3	3	VERY WEAK															
3	3	15 METERS															
4	4	LITTLE LOSS IN ALTITUDE															
4	4	ALTITUDE LOSS LESS THAN 30M															
7	7	15M/100 STALL ALT															
7	7	NONE/100 STALL ALT															
7	7	FAIRLY ABRUPT FALL-OFF TO ONE SIDE															
8	8	NONE															
9	9	SLOWER THAN OTHERS															
9	9	VERY DOUBT															
9	9	UNABLE TO STALL DUE TO LACK OF UP CONTROL TRAVEL															
9	9	AILERON REMAINS EFFECTIVE THROUGHOUT STALL															
9	9	FAIRLY QUICKLY. DOES NOT RESPOND TO CORRECTIVE ACTION AS READILY															
9	9	AS SAIL PLANE															
9	9	STALL CHARACTERISTICS EXCELLENT--AILERONS EFFECTIVE THROUGHOUT STALL--															
9	9	CAN HOLD STICK FULL AFT AND USE RUDDER AND AILERONS FOR CONTROL															
9	9	FOR SOME TIME.															
7	7																
7	7																

SAILPLANE 4 DATA

TASK	DESCRIPTION OF TASKS	1	2	PILOT 3	4	5	6	7	AVER.	STD DEV
E.	PILOT OPIN OF PLANE STALL	.00	.00	.00	.00	.00	.00	.00	3.003	.532
43	1. RUDDER, ALERON EFFECT DURING STALL	.00	.00	.00	.00	.00	.00	.00	3.003	.532
44	2. STALL WARNING	.00	.00	.00	.00	.00	.00	.00	3.003	.532
45	3. AGGRAVATED STALL-TEND TO SPIN	.00	.00	.00	.00	.00	.00	.00	3.003	.532
46	4. BACK LOGIC GRADIENT	.00	.00	.00	.00	.00	.00	.00	3.003	.532
47	5. STALL RECOVERY, ALTITUDE LOSS	.00	.00	.00	.00	.00	.00	.00	3.003	.532
48	6. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
49	7. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
50	8. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
51	9. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
52	10. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
53	11. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
54	12. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
55	13. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
56	14. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
57	15. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
58	16. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
59	17. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
60	18. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
61	19. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
62	20. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
63	21. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
64	22. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
65	23. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
66	24. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
67	25. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
68	26. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
69	27. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
70	28. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
71	29. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
72	30. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
73	31. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
74	32. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
75	33. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
76	34. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
77	35. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
78	36. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
79	37. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
80	38. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
81	39. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
82	40. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
83	41. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
84	42. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
85	43. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
86	44. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
87	45. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
88	46. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
89	47. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
90	48. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
91	49. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
92	50. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
93	51. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
94	52. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
95	53. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
96	54. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
97	55. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
98	56. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
99	57. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
100	58. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
101	59. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
102	60. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
103	61. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
104	62. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
105	63. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
106	64. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
107	65. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
108	66. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
109	67. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
110	68. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
111	69. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
112	70. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
113	71. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
114	72. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
115	73. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
116	74. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
117	75. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
118	76. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
119	77. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
120	78. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
121	79. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
122	80. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
123	81. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
124	82. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
125	83. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
126	84. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
127	85. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
128	86. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
129	87. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
130	88. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
131	89. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
132	90. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
133	91. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
134	92. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
135	93. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
136	94. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
137	95. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
138	96. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
139	97. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
140	98. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
141	99. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
142	100. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
143	101. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
144	102. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
145	103. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
146	104. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
147	105. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
148	106. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
149	107. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
150	108. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
151	109. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
152	110. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
153	111. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
154	112. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
155	113. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
156	114. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
157	115. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
158	116. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
159	117. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
160	118. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
161	119. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
162	120. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
163	121. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
164	122. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
165	123. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
166	124. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
167	125. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
168	126. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
169	127. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
170	128. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
171	129. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
172	130. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
173	131. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
174	132. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
175	133. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
176	134. STALL RECOVERY	.00	.00	.00	.00	.00	.00	.00	3.003	.532
177	135. STALL RECOVERY	.00	.							

COMMENTS

[illegible]

***** ZEROS INDICATE NO RATING BY PILOT *****

SAILPLANE 5 DATA

TASK	DESCRIPTION OF TASKS	1	2	PILOT 3	4	5	6	7	AVER.	STD DEV
42	E. PILOT OPTN OF PLANE STALLSPIN CHAR	2.00	3.00	2.00	.00	.00	3.00	1.00	2.200	.740
43	1. RUDDER,AILERON EFFECT DUR. STALL	2.00	3.00	2.00	.00	.00	3.00	1.00	2.200	.632
44	2. STALL WARNING	1.00	2.00	2.00	.00	.00	2.00	4.00	2.200	.980
45	3. STALL WARNING STALL-TEND TO SPIN	2.00	2.00	2.00	.00	.00	3.00	1.00	2.200	.490
46	4. STICK FORCE GRADIENT	2.00	3.00	2.00	.00	.00	3.00	1.00	1.800	.707
47	5. STALL RECOVERY, ALTITUDE LOSS	.00	1.00	2.00	.00	.00	2.00	1.00	2.000	.500
48	6. STALL RECOVERY	1.00	3.00	2.00	.00	.00	2.00	1.00	2.500	1.095
49	7. STALL FROM TURN AT LOW SPEED	1.00	4.00	2.00	.00	.00	2.00	1.00	2.000	.85
80	AVER. AND STD. DEV. OF SUBTASKS(EX 1,2,..)	1.7	.5	2.6	.9	2.0	.0	.0	.0	.0

COMMENTS

TASK PILOT

42 OK UNTIL NEARLY FULL AFT STICK REACHED
43 BUFFT PROGRESSIVE WITH AFT STICK MOVEMENT
44 VERY POSITIVE LANDING FLAPS--VERY LIGHT BUFFT JUST BEFORE STALL
45 LARGE LONGITUDINAL STICK MOTIONS REQD NEAR STALL. AT STICK POSITION
46 WITHIN 5CM OF AFT STOP, SHIP WILL ENTER SPIN.
47 NONE
48 ABUSED STALL RESULTS IN EVENTUAL WING DROP BUT NO INCIPIENT SPIN
49 LIGHT
50 GOOD BUT NOT IN TURNS
51 12 METERS
52 SMALL 15M IF WING ALLOWED TO DROP
53 ABOUT 15M IF WING ALLOWED TO DROP
54 RELATIVELY RESISTANT
55 BELOW INCIPIENT SPIN QUICKLY STOPPED SINCE AILERON REMAINS EFFECTIVE
56 BEYOND THE STALL
57 OK WITH STICK RELEASED, NOT INSTANT RECOVERY, BUT FAIRLY PROMPT
58 NOT TRIED
59 CONSIDERABLE LOSS OF STICK FORCE GRADIENT UNDER CG.
60 WINDS TO JUST PICK UP SPEED AND FLY OUT
61 NO TENDENCY TO FALL OFF TO EITHER SIDE AFTER STALL. STALL WARNING
62 IS IN THE FORM OF INCREASING TAIL SHAKE. OVERALL IMPRESSION OF
63 STALL AND INCIPIENT SPIN: BETTER THAN MOST
64 AILERONS HAVE LOW BUT POSITIVE EFFECTIVENESS THROUGH STALL--EXCELLENT
65 STALL CHARACTERISTICS

***** ZEROS INDICATE NO RATING BY PILOT *****

SAILPLANE 6 DATA

TASK	DESCRIPTION OF TASKS										PILOT 3		4	5	6	7	AVER.	STD DEV
43	E. PILOT OPIN OF PLANE STALL SPIN CHAR	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	4.333	1.247
44	1: BUDDER AILERON EFFECT DUE STALL	.00	5.00	3.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	3.000	1.353
45	2: STALL WARNING EFFECT DUE STALL	.00	1.00	2.00	4.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.533	1.247
46	3: AGGRAVATED STALL-TEND TO SPIN	.00	5.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	4.000	1.353
47	4: STICK FORCE GRADIENT	.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	3.567	1.886
48	5: STALL RECOVERY, ALTITUDE LOSS	.00	5.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	4.500	1.118
49	6: STALL RECOVERY	.00	5.00	3.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	2.000	1.000
48	7: STALL FROM TURN AT LOW SPEED	.00	5.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	4.000	2.517
50	8: STALL FROM TURN AT LOW SPEED	.00	5.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	4.000	2.517
AVER	AVER. AND STD. DEV. OF SUBTASKS(EX 1,2,...)	.0	.0	3.9	1.8	2.4	.5	2.5	.8	2.2	.4	5.9	1.6	2.9	1.3	3.3	1.75	

COMMENTS

TASK PILOT

43	WEAK JUST ABOVE STALL-INEFFECTIVE AFTER STALL	3
44	GOOD	4
45	STALL WARNING CONSISTED OF AIRFRAME RUFFET THAT BECAME APPARENT 8-10 SECONDS ABOVE STALL. IF THERMALING IS CONDUCTED CONSTANTLY IN STALL BUFFET THEN THE PILOT WILL IGNORE THE STALL BUFFET. NORMAL STALL BUFFET SHOULD NOT OCCUR ABOVE THERMAL SPEED.	4
46	YES TENDS TO ROLL LEFT AND NOSE PITCHES DOWN AT THE STALL.	4
47	RECOVERY IS GOOD. TENDENCY TO SPIN	4
48	LEAF WING DROPS. TENDENCY TO SPIN	4
49	TAIL PLANE WANTS TO GO COVER THE TOP OF A RIGHT TURN AND DIG IN FURTHER TO THE LEFT FROM A LEFT TURN (FEET ON THE FLOOR, CROSS-CONTROLLED STALLS)	7
50	GOOD	7
80	NOT MEASURED BUT CONSIDERABLE	7
43	LESS THAN 61M.	3
44	LESS THAN 61M.	4
45	AGGRAVATED STALL 61-91M.	4
46	MODERATE ENTRY RATE BUT POSITIVE ENTRY	4
47	FAIRLY QUICK	4
48	WELL	4
49	ADEQUATE STALL WARNING, ABRUPT NOSE SLICE FOLLOWS SOME LATERAL OSCILLATIONS JUST PRIOR TO STALL.	5
50	STICK FORCES DO NOT TELL YOU THAT YOU ARE ABOUT TO ENCOUNTER THE MORE THAN 1.5 G. IT DOES SEEM TO INCREASE NEAR THE STALL AT 2 G. HAS A TENDENCY TO YAW, ROTATE AND [BURY] THE NOSE FROM A CROSS-CONTROLLED, ABUSED STALL	5
80		7

***** ZEROS INDICATE NO RATING BY PILOT *****

SAILPLANE 1 DATA

[illegible]

SAILPLANE 2 DATA

TASK	DESCRIPTION OF TASKS	1	2	PILOT 3	4	5	6	7	AVER.	STD DEV							
F.	PILOT OPIN. OF PLANE LANDING CHAR.	2.00	.00	2.00	.00	.00	5.00	2.00	2.750	1.299							
51	1. PILOT VISIBILITY	1.00	1.00	3.00	1.00	1.00	5.00	1.00	1.429	.728							
52	2. SLOPE CONTROL	3.00	3.00	3.00	2.00	2.00	5.00	3.00	3.000	.926							
53	3. AIRS. OF LAND. AT INTENDED SPOT.	3.00	2.00	2.00	4.00	3.00	5.00	3.00	3.143	.990							
54	4. EASE OF CONTROL. SINK AT TOUCH.	1.00	2.00	2.00	3.00	3.00	4.00	2.00	2.571	.728							
55	5. EASE OF CONTROL. SINK AT TOUCH.	2.00	2.00	2.00	3.00	3.00	4.00	2.00	2.286	.881							
56	6. CONTROL DURING ROLLOUT	2.00	2.00	2.00	3.00	3.00	4.00	2.00	2.571	.728							
81	AVER. AND STD. DEV. OF SUBTASKS(EX 1,2...)	2.2	.9	2.0	.6	2.3	.5	2.7	.9	2.0	.6	4.2	.7	2.2	.7	2.5	1.01
TASK	PILOT	COMMENTS															
51	GOOD	BRAKES A LITTLE WEAK															
52	ALREADY USE	EFFECTIVE DIVE BRAKES															
53	VERY LOW	FORCE GRADIENT RESULTS IN OVERCONTROL.															
54	CONSTANT	ATTITUDE															
55	EMPLOYMENT	LOCK VERY POOR. UNLOCKING OF AIRBRAKES RESULTS IN FORCE IS															
56	REQUIRED TO	CLOSE THE AIRBRAKES. I FEEL THAT YOU SHOULD BE ABLE															
57	TO SELECT	AIRBRAKE RAPIDLY AND IT WILL REMAIN AT SELECTED POSITION															
58	WHEN THE	CONTROL IS RELEASED.															
59	HAVE	TO HOLD AGAINST FURTHER EXTENSION WHICH I PREFER TO HOLDING WITH															
60	GOOD	BRAKES COULD BE MORE EFFECTIVE															
61	AIRBRAKE	STUDINAL OK -DIRECT WIND EFFECT															
62	VERY LOW	FORCE GRADIENT AND SHORT CONTROL STICK RESULTED IN OVERCNTRL.															
63	BEHIND	THAT SAILPLANE 5															
64	INSUFFICIENT	RUDDER FOR ADEQUATE MANEUVERING.															
65	DIRECT	TAKES A LITTLE EFFORT															
66	2.3-4	INADEQUATE DIVE BRAKE EFFECTIVENESS, 6, SOME CONCENTRATION															
67	REQUIRING	CHARACTERISTICS ARE BETTER THAN AVERAGE. NO TENDENCY TO GO															
68	TO HOLD	EITHER SIDE.															
69	TO DIVE	DOWN CAN BE ACHIEVED BUT ONLY THRU USE OF EXCESSIVE SPEED.															

***** ZEROS INDICATE NO RATING BY PILOT *****

SAILPLANE 3 DATA

TASK	DESCRIPTION OF TASKS	1	2	3	4	5	6	7	AVER.	STD DEV
51	F. PILOT OPIN. OF PLANE LANDING CHAR.	3.00	3.00	3.00	1.00	.00	4.00	3.00	3.200	.400
52	1. PILOT VISIBILITY	2.00	1.00	1.00	1.00	2.00	3.00	1.00	1.429	.493
53	2. GLIDE SLOPE CONTROL	3.00	3.00	3.00	4.00	3.00	3.00	3.00	3.571	.493
54	3. AIRS. CONTROL. AIRB. EASE OF MOD.	3.00	3.00	4.00	3.00	3.00	3.00	2.00	3.143	.750
55	4. AIRS. OF LAND. AT INTENDED SPOT	3.00	3.00	4.00	3.00	3.00	3.00	2.00	3.143	.750
56	5. EASE OF CONTROL. SINK AT TOUCH.	3.00	3.00	2.00	3.00	3.00	2.00	2.00	2.429	.493
57	6. CONTROL DURING ROLLOUT	2.00	3.50	2.00	3.00	3.50	4.00	4.00	4.000	2.573
61	AVER. AND STD. DEV. OF SUBTASKS(EX 1,2,...)	2.7	5 2.6	.8 2.5	1.0 2.5	1.0 3.4	2.7 2.8	.7 2.3	.9 2.7	1.33

COMMENTS

TASK PILOT

52 EXCELLENT
53 AIR BRAKES A LITTLE WEAK
54 VERY LOW FORCE GRADIENT RESULTS IN SOME PORPOSING PRIOR TO FLARE.
55 LIGHT SUCK-OPEN FORCES
56 VERY GOOD CONTROL, BUT FAST
57 AIR BRAKE HAS A TENDENCY, AFTER BEING UNLOCKED TO FLOAT TO APPROX.
3/4 EXTENDED POSITION. I FELT THE AIR BRAKE SHOULD HAVE THE
CAPABILITY OF POSITION MOVEMENT BUT THE AIR BRAKE SHOULD REMAIN IN
THE SELECTED POSITION. SPOILER EXTENSION AT 55 KTS.
51 SIGHT FLIGHT DOWN WITH SOME
52 AIR BRAKES AS SOME
53 AIR BRAKES COULD BE MORE EFFECTIVE
54 EASY TO CONTROL IN PITCH IN TURBULENCE
55 GOOD LOW FORCE GRADIENT RESULTS IN SOME VERTICAL OSCILLATION DURING
56 THE FLARE
57 RUDDER FAIR--AILERONS FAIR
58 BRAKE CONTROL ANKWARD TO APPLY WITHOUT TAKING HAND FROM CONTROL STICK
59 HOWEVER, FULL BRAKE APPLICATION RESULTED IN ONLY MINOR BRAKING ACTION
60 LOST CONTROL DURING ONE OF LANDINGS.
61 MINIMUM RUDDER AND TAILSKID FOR DIRECTIONAL CONTROL. A STEERABLE
62 TAIL WHEEL WOULD HELP
63 2,3,4,5 COULD BE IMPROVED WITH MORE POWERFUL DIVE BRAKE
64 FAIR CROSSWIND CAPABILITY
65 FAIRLY EASY TO MAKE GOOD LANDING. TOUCHES DOWN AT HIGHER SPEEDS
66 THAN ONE WOULD LIKE TO.
67 LIMITED YAW CONTROL ON ROLLOUT.

SAILPLANE 4 DATA

***** ZEROS INDICATE NO RATING BY PILOT *****											
SAILPLANE 4 DATA											
TASK	DESCRIPTION OF TASKS	1	2	PILOT 3	4	5	6	7	AVER.	STD DEV	
51	F. PILOT OPTIM. OF PLANE LANDING CHAR.	.00	.00	3.00	.00	4.00	3.00	4.00	3.500	.500	
52	1. PILOT STABILITY	.00	1.00	3.00	1.00	3.00	3.00	3.00	2.500	.500	
53	2. GLIDE SLOPE CONTROL	.00	3.00	3.00	3.00	3.00	2.00	3.00	2.667	.471	
54	3. AIRS. CONTROL AIRB. EASE OF MOD.	.00	4.00	3.00	4.00	4.00	4.00	4.00	4.000	.000	
55	4. EASE OF LAND. AT INTENDED SPOT	.00	4.00	3.00	4.00	4.00	4.00	4.00	3.875	.383	
56	5. EASE OF CONTROL. SINK AT TOUCH.	.00	2.00	2.00	2.00	2.00	2.00	2.00	2.342	.847	
57	6. CONTROL DURING ROLLOUT	.00	1.00	2.00	1.00	2.00	2.00	2.00	1.667	.471	
81	AVER. AND STD. DEV. OF SUBTASKS(EX 1,2,...)	.0	2.5	2.3	.5	2.5	1.3	3.3	1.1	2.7	.9
									3.0	1.3	2.7
									1.4		

TASK	PILOT	COMMENTS
33	3	EXCELLENT FLARE THEN FLOATS IF SPEED IS TOO HIGH
33	3	EXCELLENT
34	4	SELECTION OF FLAPS FOR DRAG RESULTS IN LARGE PITCH ANGLES
34	4	WANT TO MODULATE FLAPS, HANDLE UNHANDY ANGLES
34	4	NOT TRIED AT LOW SPEEDS; IT WOULD BE OBJECTIONABLE TO SELECT AND
34	4	AIR BRAKE (FLAPS) REQUIRE CONSTANT FORCE AND EFFORT TO SELECT AND
34	4	MAINTAIN DESIRED POSITION BECAUSE OF HANDLE LOCATION AND TRAVEL
34	4	DIFFICULT TO OBTAIN MAX. FLAP TRAVEL. FORCES VERY HIGH AT MAX.
34	4	FLAP SPEED.
34	4	PRECISE SPEEDING FLARE
34	4	PRECISE SPEEDING CONTROL REQUIRED AT FLARE ENTRY POINT IF DROP-IN OR
34	4	LONG FLARE TO BE AVOIDED
34	4	LINEUP EFFICIENT IT IS OK IN MOST SITUATIONS
34	4	THE AIR BRAKE TO PUT IT WHERE I WANT TO MAINTAIN YAS. IN ADDITION,
34	4	LARGE FLARE TO PUT IT WHERE I WANT TO MAINTAIN YAS. IN ADDITION,
34	4	THE AIRPLANE ATTITUDE CHANGES DRASTICALLY TO WHERE I AM UNCERTAIN
34	4	OF FLIGHT PATH.
34	4	FORCES OF TRIM FROM FLAPS TO LANDING BRAKE CAUSES HIGH STICK
34	4	FORCES.
34	4	547.098RAD.
34	4	PHYSICALLY UNABLE TO SELECT 1.39GRAD FLAPS IN FINAL STAGE OF APPROACH
34	4	WANT TO HOLD HIGH INPUTS WITH RIGHT HAND TO EXECUTE GLIDE PATH AND LOG
34	4	HAVE TO SELECT 1.39GRAD FLAPS IN FINAL STAGE OF APPROACH
34	4	THE FINAL LANDING, I MADE A HIGH BASE LEG AND SELECTED LANDING
34	4	FLAPS, WHICH BLEND OFF RAPIDLY DURING FLARE. I CONSIDER ONLY AN
34	4	FLARE, AND AN IMPRECISE METHOD. IT DOES NOT OFFER THE PRECISION IN
34	4	AWAYWARD PATH WITH MODULATION WHICH IS AVAILABLE WITH THE METHOD OF CONTROL.
34	4	FLARE SPEED WITH MODULATION WHICH IS AVAILABLE WITH THE METHOD OF CONTROL.

***** ZEROS INDICATE NO RATING BY PILOT *****

SAILPLANE 5 DATA

TASK	DESCRIPTION OF TASKS	1	2	PILOT 3	4	5	6	7	AVER.	STD DEV					
51	F. PILOT OPIN. OF PLANE LANDING CHAR.	2.50	4.00	3.00	.00	.00	2.00	3.00	2.900	.663					
52	1. PILOT VISIBILITY	2.00	1.00	1.00	.00	.00	2.00	1.00	1.400	.490					
53	2. GLIDE SLOPE CONTROL	2.00	3.00	2.00	.00	.00	2.00	3.00	2.400	.490					
54	3. AIMSE. OF LAND. AT INTENDED SPOT	2.00	2.00	3.00	.00	.00	2.00	3.00	2.600	.490					
55	4. EASE OF CONTROL. SINK AT TOUCH.	2.00	3.00	3.00	.00	.00	2.00	2.00	2.400	.490					
56	5. EASE OF CONTROL. SINK AT TOUCH.	2.00	4.00	3.00	.00	.00	2.00	2.00	2.400	.490					
57	6. CONTROL DURING ROLLOUT	2.00	4.00	3.00	.00	.00	2.00	2.00	2.400	1.265					
81	AVER. AND STD. DEV. OF SUBTASKS(EX 1,2,...)	2.2	4.2	2.7	.9	2.5	1.0	.0	.0	2.7	1.5	2.7	.9	2.5	1.02

COMMENTS

TASK	PILOT	COMMENTS
51	3	EXCELLENT
52	3	COULD USE A LITTLE MORE AIR BRAKE
53	3	USE OF PARACHUTE NOT INCLUDED IN EVALUATION
54	3	DOWNWIND CHUTE NOT INCLUDED IN EVALUATION
55	3	DOWNWIND CHUTE NOT INCLUDED IN EVALUATION
56	3	DOWNWIND CHUTE NOT INCLUDED IN EVALUATION
57	3	DOWNWIND CHUTE NOT INCLUDED IN EVALUATION
81	3	DOWNWIND CHUTE NOT INCLUDED IN EVALUATION

SAILPLANE 6 DATA

TASK	DESCRIPTION OF TASKS	1	2	PILOT 3	4	5	6	7	AVER.	STD DEV
F.	PILOT OPIN. OF PLANE LANDING CHAR.	.00	.00	2.00	.00	.00	2.00	3.00	2.333	.471
51	1. PILOT VISIBILITY	.00	1.00	1.00	.00	1.00	1.00	1.00	1.000	.000
52	2. GLIDE SLOPE CONTROL	.00	1.00	3.00	.00	1.00	1.00	1.00	1.333	.705
53	3. AIMSE. OF LAND. A. INTENDED SPOT	.00	.00	2.00	.00	1.00	1.00	2.00	1.500	.808
54	4. EASE OF CONTROL. SINK AT TOUCH.	.00	2.00	1.00	.00	1.00	2.00	2.00	1.500	.808
55	5. EASE OF CONTROL. SINK AT TOUCH.	.00	2.00	2.00	.00	1.00	2.00	2.00	1.800	.400
56	6. CONTROL DURING ROLLOUT	.00	2.00	1.00	.00	1.00	2.00	1.00	1.333	.471
81	AVER. AND STD. DEV. OF SUBTASKS(EX 1,2,...)	.00	.016	.517	.710	.010	.015	.517	.714	.60

COMMENTS

TASK	PILOT	COMMENTS
51	3	EXCELLENT
52	3	GOOD--DUE TO DIVE BRAKE EFFECTIVENESS IT IS EASY TO MAKE DIFFICULT
53	3	LANDING--POOR IF NOT GREASED WELL, VERY POOR
54	3	EXCELLENT--BUT ONE HAS TO BE CAREFUL WITH BRAKES NEAR THE GROUND
55	3	SLIGHT PITCH DOWN WITH SPOILER EXTENSION(GOOD CHARACTERISTIC)
56	3	VERY GOOD EXCEPT AS NOTED
57	3	VERY GOOD
81	3	VERY GOOD

***** ZEROS INDICATE NO RATING BY PILOT *****

SAILPLANE 1 DATA

TASK	DESCRIPTION OF TASKS	1	2	PILOT	4	5	6	7	AVER.	STD DEV
58	III. FLIGHT CHARACTERISTICS IN CONVECTION									
59	A. PILOT OPINION OF TOW	1.00	1.00	1.00	.00	.00	1.00	.00	1.000	.000
60	1. EASE OF MAINTAINING POSITION	1.00	1.00	1.00	.00	.00	2.00	1.00	1.500	.764
61	2. RESPONSE TO VERTICAL CURRENTS	1.00	2.00	1.00	.00	.00	1.00	2.00	1.333	.743
62	3. RELEASE	1.00	.00	2.00	.00	2.00	2.00	2.00	1.833	.687
82	AVER. AND STD. DEV. OF SUBTASKS(EX 1,2,...)	1.0	.0	1.5	.5	1.3	.5	.0	.0	2.7
							.5	1.7	.5	1.7
									.5	1.6

COMMENTS

PITCH PRIMARILY--LAT/DIR-2
NO DIFFICULTY WAS EXPERIENCED DUE TO PRESENCE OF VERTICAL CURRENTS
HAD TO USE SLIGHT FORWARD STICK FORCE DURING TOW--TRIM NOT ADEQUATE
FORCE WAS VERY LOW HOWEVER

SAILPLANE 2 DATA

TASK	DESCRIPTION OF TASKS	1	2	PILOT	4	5	6	7	AVER.	STD DEV
58	III. FLIGHT CHARACTERISTICS IN CONVECTION									
59	A. PILOT OPINION OF TOW	1.50	2.00	3.00	.00	3.50	2.00	3.00	2.500	.707
60	1. EASE OF MAINTAINING POSITION	1.00	2.00	2.00	.00	3.00	2.00	4.00	2.417	.837
61	2. RESPONSE TO VERTICAL CURRENTS	2.00	3.00	3.00	.00	2.00	2.00	4.00	2.500	.957
62	3. RELEASE	1.00	3.00	2.00	.00	2.00	2.00	3.00	2.500	.500
82	AVER. AND STD. DEV. OF SUBTASKS(EX 1,2,...)	1.3	.5	2.5	.5	2.7	.5	.0	.0	2.5
							.5	2.0	.0	3.0
								.8	2.3	.77

COMMENTS

GOI TO STAY WITH IT, DIRECTIONAL MOST OBVIOUS
GOI SOME TOW ROPE REBOUNDING
I BELIEVE THAT THE BOUNCY RIDE IN TURBULENCE IS CAUSED BY WING FLX
I WOULD RATE THE SAILPLANE ABOUT THE SAME HERE AS IN SMOOTH AIR.

SAILPLANE 3 DATA

TASK	DESCRIPTION OF TASKS	1	2	PILOT	4	5	6	7	AVER.	STD DEV
58	III. FLIGHT CHARACTERISTICS IN CONVECTION									
59	A. PILOT OPINION OF TOW	2.00	3.00	2.00	.00	.00	3.00	3.00	2.600	.490
60	1. EASE OF MAINTAINING POSITION	1.50	3.00	2.00	.00	3.00	2.00	3.00	2.417	.607
61	2. RESPONSE TO VERTICAL CURRENTS	3.00	4.00	2.00	.00	3.00	2.00	3.00	2.500	.500
62	3. RELEASE	1.00	4.00	3.00	.00	3.00	2.00	2.00	2.833	.687
82	AVER. AND STD. DEV. OF SUBTASKS(EX 1,2,...)	2.0	.8	3.5	.5	2.3	.5	.0	.0	2.7
							.5	2.0	.0	2.7
								.5	2.5	.70

COMMENTS

MODERATE CONTROL ACTIVITY REQD.
NO PROBLEMS
SOME TENDENCY OF NOSE TO PORPOISE.
TENDENCY TO PITCH WHEN ENCOUNTERING TURBULENCE
NO PROBLEMS
NOISY
SOME STICK INSTABILITY IN TURBULENCE
HIGH WORKLOAD IN RUDDERS ANDAILERONS

***** ZEROS INDICATE NO RATING BY PILOT *****

SAILPLANE 4 DATA

TASK	DESCRIPTION OF TASKS	1	2	PILOT 3	4	5	6	7	AVER.	STD DEV
58	III. FLIGHT CHARACTERISTICS IN CONVECTION									
59	A. PILOT OPINION OF TOW	.00	2.00	2.50	.00	.00	3.00	3.00	2.625	.415
60	1. EASE OF MAINTAINING POSITION	.00	2.00	2.00	.00	.00	2.00	2.00	2.000	.000
61	2. RESPONSE TO VERTICAL CURRENTS	.00	2.00	2.00	.00	.00	2.00	2.00	2.000	.000
62	3. RELEASE	.00	2.00	3.00	.00	.00	2.00	2.00	2.000	.471
82	AVER. AND STD. DEV. OF SUBTASKS(EX 1,2,..)	.0	.0 2.0	.0 2.3	.5	.0	.0 2.0	.0 2.0	.0 2.1	.29

COMMENTS

TASK	PILOT	COMMENTS
60	3	NO PROBLEM AT ALL
62	3	NOISY
82	3	NO SIGNIFICANT DIFFERENCE FROM STILL AIR

SAILPLANE 5 DATA

TASK	DESCRIPTION OF TASKS	1	2	PILOT 3	4	5	6	7	AVER.	STD DEV
58	III. FLIGHT CHARACTERISTICS IN CONVECTION									
59	A. PILOT OPINION OF TOW	2.00	5.00	2.00	.00	.00	4.00	3.00	3.200	1.166
60	1. EASE OF MAINTAINING POSITION	1.50	2.00	.00	.00	.00	3.00	5.00	3.000	1.325
61	2. RESPONSE TO VERTICAL CURRENTS	2.00	2.00	.00	.00	.00	3.00	3.00	2.500	.816
62	3. RELEASE	1.00	.00	.00	.00	.00	3.00	2.00	2.000	.816
82	AVER. AND STD. DEV. OF SUBTASKS(EX 1,2,..)	1.7	.5 2.0	.0	.0	.0	.0 3.0	.0 3.3	1.2 2.5	.99

COMMENTS

TASK	PILOT	COMMENTS
59	2	OK AT 70KTS, AT 80KTS WORSE THAN IN SMOOTH AIR. MUST FLY WITH STICK
59	2	RIGID. CANNOT FLY PITCH BY PRESSURE, MUST FLY BY POSITION.
62	3	NO ROUGH AIR TOW MADE.
62	6	WIND AND ROLL RATES MAKE STAYING BEHIND TOWPLANE DIFFICULT IN ROUGH
62	7	THE ROLLS
62	7	LATERAL POSITIONING IS AN EASY TASK; PITCH IS DIFFICULT DUE TO
62	7	OVERCONTROL TENDENCY

SAILPLANE 6 DATA

TASK	DESCRIPTION OF TASKS	1	2	PILOT 3	4	5	6	7	AVER.	STD DEV
58	III. FLIGHT CHARACTERISTICS IN CONVECTION									
59	A. PILOT OPINION OF TOW	.00	3.00	2.00	.00	.00	5.00	2.00	3.000	1.233
60	1. EASE OF MAINTAINING POSITION	.00	2.00	2.00	.00	.00	2.00	2.00	2.250	.000
61	2. RESPONSE TO VERTICAL CURRENTS	.00	2.00	2.00	.00	.00	2.00	2.00	2.000	.000
62	3. RELEASE	.00	.00	2.00	.00	.00	2.00	2.00	2.000	.000
82	AVER. AND STD. DEV. OF SUBTASKS(EX 1,2,..)	.0	.0 2.0	.0 2.0	.0	.0	.0 2.0	.0 2.0	.0 2.0	.00

COMMENTS

TASK	PILOT	COMMENTS
61	3	NOT EXCESSIVE
62	3	SAME AS SMOOTH AIR
62	7	AIR SPEED BLEEDS OFF QUICKLY DURING PULLUP, REQUIRING PILOT ATTENTION
62	7	HIGHER WORKLOAD THAN IN SMOOTH AIR, OF COURSE, BUT NO UNUSUAL
62	7	CHARACTERISTICS DUE TO TURBULENCE

SAILPLANE 1 DATA

COMMENTS

SATI PLANE 2 DATA

COMMENTS

SOME UNDESIRABLE CHARACTERISTICS, RUFFETING. WHEN SOME PRECAUTIONS DUE TO STICK POSITION AFT WITH LOW FORCE AND YAW STICKING OSCILLATION.

1. RUDDER EFFECTIVENESS COULD BE IMPROVED. 4, WILL SPIRAL HANDS FOR LONG PERIODS. LACK OF DIRECTIONAL STABILITY AND DIFFICULT TURN COORDINATION. LOW RUDDER EFFECTIVENESS. LOW WORKLOAD DUE TO RUDDER AND AILERON ACTIVITY TO KEEP SIDESLIP HIGH. ZERO-GAVES IMPRESSION OF LOW DIRECTIONAL STABILITY.

***** ZEROS INDICATE NO RATING BY PILOT *****

SAILPLANE 3 DATA

TASK	DESCRIPTION OF TASKS	1	2	PILOT 3	4	5	6	7	AVER.	STD DEV
63	B. PILOT OPINION OF CIRCLING FLIGHT	2.00	2.00	2.00	.00	.00	2.00	2.00	2.000	.000
64	1. LOW SPEED HANDLING	1.00	2.00	3.00	.00	2.00	2.00	2.00	2.000	.577
65	2. STALL-SPIN SUSCEPTIBILITY	2.00	2.00	2.00	.00	2.00	3.00	1.00	2.000	.577
66	3. EASE OF CENTERING THERMAL	1.00	2.00	2.00	.00	2.00	2.00	3.00	2.000	.577
67	4. SPEED CONTROL	2.00	2.00	3.00	.00	2.00	2.00	3.00	2.333	.471
83	AVER. AND STD. DEV. OF SUBTASKS(EX 1,2,3..)	1.5	.5	2.0	.0	2.5	.5	.0	2.0	.5
84	PILOT									
85	COMMENTS	PLEASANT, ALTHOUGH STICK FORCES ON THE LIGHT SIDE								
86		NO STALL-SPIN TENDENCY OBSERVED WHILE THERMALING								
87		COMFORTABLE								
88		BETTER THAN SAILPLANE 2								
89		WILL OCCASIONALLY SELF-TIGHTEN DURING STRONG UP-GUSTS. CAN TIGHTEN								
90		ITSELF INTO STALL IN STRONG GUST								
91		ONE FEELS IMMEDIATELY AT HOME IN THE SHIP								
92		GOOD CONTROL HARMONY AT SOKTS BUT POOR AT HIGHER SPEEDS, RUDDER								
93		COORDINATION AND AIRSPEED CONTROL CREATE FAIRLY HIGH WORKLOAD.								
94										

SAILPLANE 4 DATA

TASK	DESCRIPTION OF TASKS	1	2	PILOT 3	4	5	6	7	AVER.	STD DEV
63	B. PILOT OPINION OF CIRCLING FLIGHT	.00	2.00	2.50	.00	.00	3.00	4.00	2.875	.740
64	1. LOW SPEED HANDLING	.00	2.00	2.00	.00	.00	3.00	4.00	2.750	.829
65	2. STALL-SPIN SUSCEPTIBILITY	.00	2.00	2.50	.00	.00	3.00	3.00	2.375	.415
66	3. EASE OF CENTERING THERMAL	.00	2.00	3.00	.00	.00	3.00	3.00	2.750	.433
67	4. SPEED CONTROL	.00	2.00	3.00	.00	.00	5.00	3.00	3.250	1.090
83	AVER. AND STD. DEV. OF SUBTASKS(EX 1,2,3..)	.0	.0	2.0	.0	2.6	.4	.0	2.0	.81
84	PILOT									
85	COMMENTS	GOOD								
86		NO UNDESIRABLE CHARACTERISTICS NOTED								
87		TENDED TO OVERCONTROL WITH RUDDER								
88		NOT AS GOOD AS SAILPLANE 1								
89		I DON'T FIND TRIMMER OBJECTIONABLE. WING-ROCK IS BOTHERSOME								
90		WHENEVER GOOD IN CIRCLING FLIGHT, THOUGH NOT AS GOOD AS SAILPLANE 1								
91		GUSTS CAUSE NOSE TO CHANGE ATTITUDE UP AND DOWN. THIS TENDENCY								
92		MUST BE BROUGHT BY PILOT TO MAINTAIN THERMAL LOCATION.								
93		EXCESSIVE TOP ALLEKON REQUIRED.								

SAILPLANE 5 DATA

[illegible]

SAILPLANE 6 DATA

[illegible]

***** ZEROS INDICATE NO RATING BY PILOT *****

SAILPLANE 1 DATA

TASK	DESCRIPTION OF TASKS	1	2	PILOT 3	4	5	6	7	AVER.	STD DEV							
68	C. PILOT OPINION OF CRUISING FLIGHT	1.00	1.00	1.00	.00	.00	4.00	1.00	1.600	1.200							
69	1. EASE OF CONTROLLING AIRSPEED	1.00	1.00	1.00	.00	2.00	4.00	1.00	1.667	1.479							
70	2. PULL UP INTO THERMAL	1.00	1.00	2.00	.00	2.00	2.00	2.00	1.867	1.479							
71	3. EASE OF PERF. SECONDARY TASKS	1.00	1.00	1.00	.00	2.00	2.00	2.00	1.500	.500							
72	4. RIDE QUALITY	1.00	2.00	4.00	.00	2.00	2.00	2.00	2.167	.898							
73	5. EASE OF MAIN. STRAIGHT FLIGHT	1.00	2.00	1.00	.00	.00	2.00	1.00	1.400	.490							
84	AVER. AND STD. DEV. OF SUBTASKS(EX 1,2,..)	1.0	.0	1.4	.5	1.8	1.2	.0	.0	2.0	.0	2.4	.8	1.6	.5	1.7	.79

COMMENTS

TASK	PILOT	COMMENTS
69	5	BELOW 611AS+73 ABOVE 611AS DUE TO TRIM
70	3	UNABLE TO TRIM TO HIGH SPEEDS, I.C. ABOVE 61KTS.
71	3	SPEED BLEEDS OFF QUICKLY. HAVE TO WATCH IT.
72	3	EXCELLENT
73	3	GOOD, BUT SMALL, UNCOMFORTABLE COCKPIT DEGRADES IT
84	7	EXCELLENT
84	7	LARGE ATTITUDE CHANGES WITH AIRSPEED
84	7	VERY LOW WORKLOAD. OVERALL, THE BEST FLYING OF ALL SAILPLANES
85	7	THEY SHOULD ALL FLY THIS WAY

SAILPLANE 2 DATA

TASK	DESCRIPTION OF TASKS										PILOT 3		1	2	4	5	6	7	AVER.	STD DEV						
68	C. PILOT OPINION OF CRUISING FLIGHT										2.00	2.00	.00	.00	2.00	4.00	2.200	.980								
69	1. EASE OF CONTROLLING AIRSPEED										2.00	2.00	.00	.00	2.00	3.00	2.167	.687								
70	2. PULL UP INTO THERMAL										1.00	1.00	.00	.00	3.00	4.00	2.000	1.155								
71	3. EASE OF PERF. SECONDARY TASKS										1.00	1.00	.00	.00	3.00	4.00	2.000	1.118								
72	4. RIDE QUALITY										2.00	2.00	.00	.00	3.00	3.00	2.167	.373								
73	5. EASE OF MAIN. STRAIGHT FLIGHT										1.00	1.00	.00	.00	4.00	3.00	2.333	1.106								
84	AVER. AND STD. DEV. OF SUBTASKS(EX 1,2,...)										1.2	.4	1.4	.5	2.0	.6	.0	.0	2.8	.4	2.6	.8	3.4	.5	2.2	.96

COMMENTS

TASK	PILOT	COMMENTS
70	3	VERY PLEASANT
71	3	DIFFICULT
72	3	GOOD
73	3	NO PROBLEM
73	3	DIRECTIONALLY LOOSE
84	3	NOSE WANDERS, BUT NOT SO AS TO DETRACT FROM MISSION
84	3	BOUNCY BECAUSE OF AIRSPEEDS. NEGATIVE FLAPS RESULT IN QUICK AIRSPEED
84	3	CHANGES (QUICKER THAN SAILPLANE 5) WITH NO ATTITUDE OR SOUND CHANGES.
85	3	THIS FEATURE MAY MAKE SHIP DIFFICULT FOR TRANSITIONING.

SAILPLANE 3 DATA

[illegible]

SAILPLANE 4 DATA

[illegible]

***** ZEROS INDICATE NO RATING BY PILOT *****

SAILPLANE 5 DATA

TASK	DESCRIPTION OF TASKS	1	2	PILOT 3	4	5	6	7	AVER.	STD DEV
68	C. PILOT OPINION OF CRUISING FLIGHT	1.00	3.00	1.00	.00	.00	3.00	3.00	2.200	.980
69	1. EASE OF CONTROLLING AIRSPEED	1.00	3.00	2.00	.00	.00	3.00	3.00	2.600	1.366
70	2. PULL UP INTO THERMAL	2.00	3.00	1.00	.00	.00	2.00	2.00	2.000	.632
71	3. EASE OF PERF. SECONDARY TASKS	1.00	6.00	1.00	.00	.00	4.00	4.00	3.200	1.939
72	4. RIDE QUALITY	1.00	2.00	1.00	.00	.00	2.00	3.00	1.800	.748
73	5. EASE OF MAIN. STRAIGHT FLIGHT	1.00	1.00	1.00	.00	.00	3.00	2.00	1.600	.800
84	AVER. AND STD. DEV. OF SUBTASKS(EX 1,2,..)	1.2	4.2	1.7	1.2	.4	.0	.0	3.2	1.2
85	COMMENTS	.7 2.2 1.34								
69	AT HIGH CRUISING SPEEDS, UNABLE TO TRIM. POSITIVE LAG GIVES NOSE UP									
70	INPUT TO STICK									
71	SPECTACULAR DUE TO LARGER KINETIC ENERGY OF GLIDER									
72	MUST HOLD STICK RIGID, NOT UNPLEASANT IF CONTROL TASK IS VERY									
73	OPEN LOOP.									
74	OK									
75	EXCELLENT									
76	EXCELLENT									
77	CAN'T LET GO OF STICK									
78	IN TURBULENCE, IN THE APPROACH CONFIGURATION, FULL OF RUDDER ACTIVITY									
79	IS REQUIRED. SLOWER ROLL RATE IS NOTICEABLE, LOT OF RUDDER ACTIVITY									
80	WAS NEEDED IN THIS PHASE OF FLIGHT.									
81	AT 85-90 KTS PENETRATION SPEED, QUIET EXCEPT FOR LIGHT RATTLE IN									
82	WINGS. ATTENTION TO AIRSPEED(PITCH) CONTROL LEAVES LITTLE TIME FOR									
83	SECONDARY TASKS. TURBULENCE CAUSES CONTINUAL SMALL PITCH UPSETS.									

SAILPLANE 6 DATA

TASK	DESCRIPTION OF TASKS	1	2	PILOT 3	4	5	6	7	AVER.	STD DEV
68	C. PILOT OPINION OF CRUISING FLIGHT	.00	.00	1.00	.00	.00	2.00	2.00	1.667	.471
69	1. EASE OF CONTROLLING AIRSPEED	.00	1.00	1.00	.00	.00	2.00	2.00	1.500	.500
70	2. PULL UP INTO THERMAL	.00	1.00	2.00	.00	.00	2.00	2.00	1.500	.500
71	3. EASE OF PERF. SECONDARY TASKS	.00	1.00	1.00	.00	.00	2.00	2.00	1.500	.500
72	4. RIDE QUALITY	.00	2.00	1.00	.00	.00	2.00	2.00	1.500	.500
73	5. EASE OF MAIN. STRAIGHT FLIGHT	.00	1.00	2.00	.00	.00	2.00	2.00	1.750	.433
84	AVER. AND STD. DEV. OF SUBTASKS(EX 1,2,..)	.0	1.2	1.8	.7	.0	2.8	2.0	1.9	.92
85	COMMENTS									
69	EXCELLENT									
70	SHOULD BE VERY MODERATE IN THIS GLIDER									
71	AIRSPEED DECREASES VERY RAPIDLY									
72	QUICK, EASY BECAUSE OF LARGE STABILITY									
73	NOT AS SOFT AS GLASS SHIP, NOISY									
84	GOOD									
85	LARGE ATTITUDE CHANGES WITH AIRSPEED, NOISY AT TIMES									
86	SAME GENERAL COMMENTS AS FOR CIRCLING FLIGHT									

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16. Abstract Seven test pilots flew six sailplanes in a round-robin evaluation of sailplane handling qualities. An evaluation was made of the handling qualities over the sailplane operational envelope using the Cooper-Harper Rating Scale and pilot comments as the evaluation instrument. The sailplanes were chosen to represent the range of handling and performance characteristics of high performance sailplanes in current use. The evaluation sailplanes were found generally deficient in the area of cockpit layout. The pilots indicated general dissatisfaction with high pitch sensitivity especially when coupled with inertially induced stick forces. While all sailplanes were judged satisfactory for centering thermals and in the ease of speed control in circling flight, pilot opinions diverged on the maneuvering response, pull-out characteristics from a dive, and on phugoid damping. Lateral-directional control problems were noted mainly during takeoff and landing for most sailplanes with the landing wheel ahead of center of gravity. Pilot opinion of in-flight lateral-directional stability and control was generally satisfactory. Five of the evaluation sailplanes exhibited a very narrow airspeed band in which perceptible stall warning buffet occurred. However, this characteristic was considered not objectionable when stall recovery was easy. The pilots objected to the characteristics of a wide airspeed band of stall warning followed by a stall with yawing and rolling tendency and substantial loss of altitude during the stall. Glide path control for the evaluation sailplanes was found to be generally objectionable.					
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